THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. XV. No. 357—18th YEAR.] LONDON, JUNE 26, 1866. [Subscription per Ann. 15s. in Advance 18s. Credit.] TREBLE No. 1s. 4d. Unstamped.

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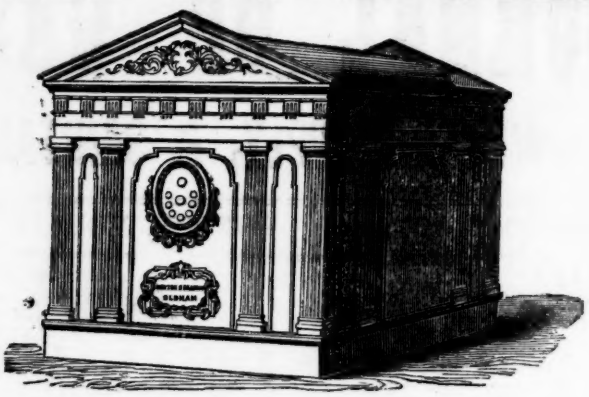

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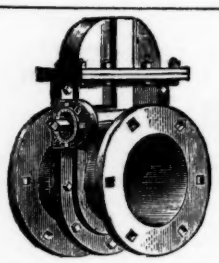

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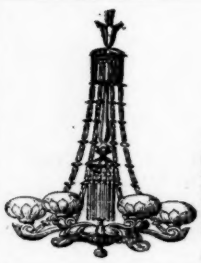

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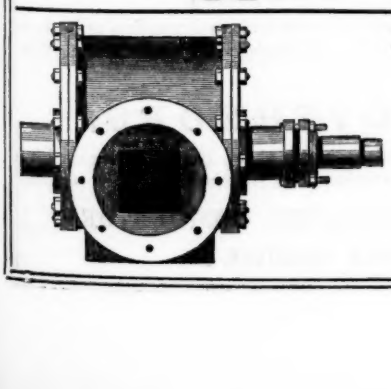

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It is worthy of remark, that the only two other Firms who receive Awards *both manufacture imitations of Thomas Glover's* Patent Dry Gas-Meter, and the reason given for these Awards is "*construction* and sound workmanship." Thomas Glover, therefore, claims that the *construction* of his Meter has obtained *three Awards from the Jury of the International Exhibition of* 1862; at the same time, *contrasting* the Award granted for his Meter by the words, "*For excellence of manufacture, as regards Dry-Meters.*"

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ERRATA.

In the report of the proceedings on the Neath New Gas Bill, a misprint has occurred in the evidence of Mr. Porter (page 480, col. 2, last line). For "250,000 tons of coal to produce 180,000 cubic feet," read "2250 tons of coal to produce 18,000,000 cubic feet." And in line 12, page 481, the words "and other residuals" should be inserted after the words "ammoniacal liquor."

TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

NOTICES.

The subscription is 15s. per annum, if paid in advance during the month of January, or 18s. credit, in two sums of 9s. each, in July and January of each year. Post-Office orders must be made payable at the Charing Cross Money-Order Office, to William H. Bennett, No. 42, Parliament Street, Westminster.

The next number will be published on Tuesday, July 10, and the subsequent numbers on each successive alternate Tuesday.

This JOURNAL has been duly registered at the General Post Office for transmission abroad.

Stamped copies, when forwarded by post, must be folded so as to expose the stamp; they are otherwise liable to the full postage charge for letters.

All Communications to be addressed to the Editor, No. 42, Parliament Street, Westminster; and orders for Advertisements to the Publisher, Mr. W. B. King, No. 11, Bolt Court, Fleet Street.

THE JOURNAL OF GAS LIGHTING
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, JUNE 26, 1866.

Notes upon Passing Events.

MR. HUSSEY VIVIAN'S long and interesting speech on the probable supplies of British coal was very satisfactory to those numerous persons who wish to be convinced that the prosperity of this kingdom can never end, and still more to those who desire to see the foundation of Mr. Gladstone's scheme for paying the National Debt destroyed. Mr. Vivian was eminently practical; he did not attempt to extend the area of coal-beds otherwise than by hopes of future discoveries in localities at present condemned. He relied greatly on mechanical improvements, which would enable coal to be worked profitably at great depths, and he disputed with some considerable show of reason the theory of the increasing heat of the earth at great depths. But, after all, the fact remains that we are daily diminishing in increasing quantities a source of wealth that does not grow, without having any idea of a substitute when our coal is exhausted; and strangely enough the Chancellor of the Exchequer, who is now so impressed by the prospect of our future fuel-less condition, is the minister who advocated with success a treaty under which we bound ourselves not to tax the export of this precious source of our political superiority and social wealth. We are very much inclined to believe that in this, as in most other questions of a similar character, the remedy or palliation must be left to the common sense of coalowners and consumers. It is difficult to see how legislation can be applied to enforce economy on the general consumption of coal. As to the proposals for paying off our debt, these must rest on financial considerations more solid than the supply of coals. In a ruin so total as that which will be consummated by the cessation of every factory driven by steam, the silence of every railway, and the return to scanty supplies of home-grown or imported fuel for domestic purposes, a few millions more or less of debt will be of no

consequence—a mere spot in such a universal cancer of insolvency. With our coal-mines our tea-trade will disappear. We shall not only cease to manufacture calico, but to drink tea or any other liquor requiring such an extravagance as boiling water. The cold-water system will be universal, and "cold without," if we can find anything to exchange for the *eau de vie* of our neighbours, will be our evening drink. Joking apart, the very recent inquiries of Mr. Robert Hunt, the keeper of mining records, as to the supplies of cannel coal, confirm the unpleasant predictions of Mr. Jervons. Mr. Hunt was requested to inquire "what quantity "of cannel coal is annually raised in the United Kingdom, "and what probability there was of meeting any greatly "increased demand." The results of a journey of inquiry, specially undertaken for this purpose, were embodied in a report which now lies before us. Cannel coal is worked to Staffordshire, Nottinghamshire, Derbyshire, Yorkshire, Lancashire, and Cheshire, Lancashire being the greatest producer of the true cannel, part of that raised in Yorkshire being of a very inferior character. The total production of England in 1865 was 946,175 tons; at least 50,000 tons of this, probably much more, has been reserved for the production of shale and coal oil. In North Wales, in the district of Mold and Bagilt, 150,000 tons were raised, the whole of which was consumed in the mineral oil-works of Flintshire. The total quantity of cannel coal raised in Scotland during the same year was 383,500 tons, of which 100,000 tons was used in making oil. Thus the total quantity of cannel coal produced in the United Kingdom in 1865 was 1,418,176 tons, of which at least 250,000 were used for the distillation of coal oil. There is already a steady rise in the price of cannel coal; Wigan cannel, a few years since 13s. a ton, is now 16s. 6d.; in Yorkshire the present price is 10s. to 12s., and the progressive advance points to 20s. as the price per ton within a few years.

This is the age of paradoxes, for between honest zeal and the desire to astonish, some new amazing theory is started every month of the publishing season. Mr. G. A. Rowell, assistant curator in the Oxford Museum, and author of the "Beneficent Distribu-"tion of the Sense of Pain," must be numbered amongst the zealous. He undertakes to prove that Oxford is above the average in health, and there he has fair success, although such is the exceptional condition of the population of Oxford that we still want data for any useful opinion. But he goes further, and undertakes to prove that damp situations, even if subject to flood, are more healthy than dry. We shall not argue the question, we remain quite open to conviction, although if about to choose the site of a villa we do not think we should choose one where the cellars were periodically filled, or where it was necessary to proceed to the garden in a boat or pair of wading boots during one quarter of the year. Mr. Rowell begins by stating that he has no horror of water, even if stagnant, and he considers that the presence of water, whether in ponds or rivers or aquaria in a living room, has a beneficial effect in moderating the extremes of temperature. Mr. Rowell may be quite right, but the way in which he handles statistics is curious, although not uncommon. He finds the lowest death-rate in Rutland and Westmoreland, where it is 18 in 1000, and he jumps at once to the conclusion that there are few deaths in those counties because there is much rain, and there are many lakes and rivers in the one and the other is near Lincolnshire, and therefore derives its health from the moist atmosphere of that county. It does not seem to occur to him that where towns are few and the population sparse and not increasing, the death-rate must be lower than where great towns, an increasing population, many marriages, and many babies help on the funerals. Then again he runs off with the notion that Lincolnshire is a county of fens and floods, not being aware, apparently, that a considerable portion of Lincolnshire—the heaths and wolds all covered with an agricultural population—is essentially dry, and even distressed in summer for want of water. Little Rutlandshire certainly does not owe the absence of death to a damp atmosphere; how is it that a man of science has not had recourse to a series of experiments with the hygrometer, while Manchester, one of the most unhealthy towns in the kingdom, suffers under an almost perpetual mist and drizzle? Turning from places to persons, Mr. Rowell claims that gardeners and shepherds enjoy longer years because they are rained upon, and tanners live longer than curriers because the latter is a drier business. But how about bishops and baronets, both famously long-lived? Bishops are certainly not given as a body to damp walks or rides. No doubt there are baronets in Essex who despise umbrellas, but they are the exception. It is evident that Mr. Rowell is not of the mind of Beau Brummel when he accounted for a cold by saying that he had been put into the same coffee-room with a damp stranger. Mr. Rowell considers damp strangers wholesome. But while Mr. Rowell's general arguments are very loose, and show for a man of science a wonderful ignorance of the physical character of his own county, he has some really very curious facts in support of his theory. "The village of Binsey has "long been noted in Oxford for the longevity of its inhabi-"tants. It is situate at somewhere less than a mile north-"west from the Great Western Station, almost on a level "with the Isis, which runs near it, and therefore liable to "flood on a very slight rise of the river. The surrounding "meadow-land is very flat, so that the village is often sur-"rounded by floods to a considerable extent, and its inhabi-"tants exposed to the effluvium from every direction on "their subsiding. The average life in this parish was forty-"five years and six months, and in six of the highest parishes "in the neighbourhood the average life was only twenty-nine "years and nine months." Again he cites: "The House at "the Weirs, in Cumner Meadow, on the Thames, about five "miles from Oxford, although in a valley, stands very open "and exposed, and so low that the house, which is close to "the river, is flooded on a very slight rise of the water. "During the late long flood, the family, consisting of the "father, mother, and four children, were obliged to live "entirely upstairs, the ground-floor being flooded to the "depth of 2 or 3 feet, and the house unapproachable, except "by boat, for about a mile in any direction. To such con-"ditions they are liable during every flood season, and on one "occasion the parents of the present occupier, with their "family, were thus obliged to live upstairs for eleven con-"secutive weeks; and, on another, the house was unapproach-"able on foot from September to the end of the following "March. No place can be more damp or subject to fogs; "and, after the subsidence of a flood, it is surrounded by hun-"dreds of acres of low land, giving off its flood effluvium. "And yet this family has been healthy. An aged couple there "were the first of the family who lived in the house; one of "them died at the age of eighty-two, and the other was some-"what older; and since their time, although there is now a "fourth generation, no death has occurred in the family, unless "from old age or accident, except that of one daughter, who "lived in the house until she was married, and then *left home "for higher ground, and died.*" Other instances of the same character are quoted, for which the curious may refer to the author or his pamphlet. In the importance of a supply of good water we fully agree with Mr. Rowell, and also that in villages and poor neighbourhoods, where a house to house supply cannot easily be afforded, stand-pipes or conduits should be established, and the water of public pumps carefully protected from pollution by filtration. Mr. Bailey Denton has more than once called attention to the cheap rate at which villages might be supplied with water by using the supplies of land drainage, and to the importance of such a supply.

Mr. Henry Dempster, "advocate for sea fisheries during the "last twenty-six years," has issued a thin pamphlet on "Open "Sea Fishing Reform"—we should say a very ungrateful subject. Mr. Dempster wants to change the habits and customs of a race of fishermen by the joint agency of an Act of Parliament and a series of joint-stock companies. He finds that the best fish in quality and size are caught in the deep sea, and that deep-sea fishing can only be pursued in large, well-decked vessels, with wells for keeping the fish caught alive—or, to use the professional term, that seems to tickle our author's ear, "cod-bangers." On the advantage to the public of "cod-bangers" over open boats, Mr. Dempster is unanswerable. Not only do they collect a better class of fish, but they avoid destroying the small and inferior; while, with the long-shore, open-boat fishermen all is prey that comes to the net. "Fish caught in deep water, when boiled, are as "firm as a bit of cheese; the liths part asunder like a China "orange, with a nice curd between the liths, and the fish then "is highly flavoured." To bring about this desirable consummation, the one thing needed is a show of profit. There is so much of a lottery in everything connected with shipping, that there is less difficulty in placing the shares of ships than of

any other speculation. But do fishing companies pay? If they do, they will soon spread round the coast. But, then, supposing "the capital raised, and suitable decked and welled "cod-bangers built, we cannot expect open-boat fishermen to "offer their services for such vessels," says Mr. Dempster. "They are hardy and brave, but they are not sailors." This difficulty, so candidly admitted, has made Mr. Dempster's self-imposed task, as the apostle of sea fishing reform, rather difficult. He has, it seems, travelled through the very populous and prolific villages of fishermen on the north-east coast, and preached to them the advantages of "cod-bangers," but they are deaf to the voice of this charmer, and cannot be made to see the advantage of a new system of sea fishing, in which they can take no part, or only a secondary part. Then, again, Mr. Dempster, forgetting the age and country he lives in, desires to prevent fishermen from selling their fish as they think best. He would create a class of licensed salesmen, through whose hands alone "all white fish, salmon, "herrings, and shellfish must pass," with penalties, informers, and poachers, of course. To such absurdities are enthusiastic reformers led—like the advocates of peace-at-any-price in Europe gloating over a bloody battle in America. But our reformer is not satisfied with ordinary difficulties, he even ventures to attack the privileges of women. Mr. Dempster is either an old bachelor or one of a firm where the grey mare is the better horse. His indignation is greatly roused by the custom of "creel-hawking" common in the northern ports. The women "entertain the idea that it is the duty of every "woman that becomes a wife to work for a man, or at least "to greatly assist him in his calling. Besides gathering bait "and baiting lines, many of them hawk and sell fish they "carry about in creels on their backs. Being wholesale and "retail dealers of their husbands and others produce, they get "money in their hands unchecked. Clever women become "leading partners in the united firm, and wield the reins of "power." Mr. Dempster was so unwise as to preach revolt to the fishermen husbands, and those who remember the fish-wife in the "Antiquary" will not be surprised to learn that, on one occasion, the sea-fishery reformer having explained to some fishwives his plans of deep-sea fishing and anti-creel arrangements, "one pushed her head forward, clenched her "fists, and, looking savagely in my face, at the top of her "voice exclaimed, 'You will no' be allooed!'" Such are the trials of fish and other reformers. We should recommend our friend, with whose anxiety to supply the country with more good fish every housekeeper will sympathize, to give up trying to persuade women that they will be better without power and money, and turn his mind to showing a clear profit of 10 per cent. on fishing companies.

The preamble of the Bill for a second line to Brighton, with a station on the low level of that town, and stations in London at Charing Cross, Ludgate Hill, Cannon Street, and all along the Metropolitan line, has passed the House of Commons committee by a unanimous vote. It is to be hoped that Lord Redesdale's crotchets will not kill it in the House of Lords, if the Brighton directors have not the good sense to make a treaty of peace while there is time to save money. Sooner or later they must come to an understanding with a line which is so imperatively required at both ends of the traffic. And here we may observe that this is just one of those examples of works urgently required for public convenience which would be indefinitely delayed if Lord Redesdale's narrow-minded and well-meant rules were made law. No reasonable person can complain of the price at which the Brighton Railway conveys all classes of passengers; but it has to serve a traffic which is growing every year with the growth of the great sea-suburb of London and of London itself. One line cannot, under these circumstances, serve a pleasure-traffic crowded into a few hours and limited months of the year. A writer in the *Times* has been challenging Lord Redesdale to name the useless lines which speculators have created. The popular instance, the London, Chatham, and Dover, is not more disastrous to shareholders than Spanish, Sardinian, and many American lines, and much more useful to the country. The original shareholders in the Manchester, Sheffield, and Lincolnshire, are still looking for 5 per cent., but what a boon to British trade and agriculture has that investment been. The capital of the country is not a fixed quantity, but cream daily rising to the surface of our prosperity, and it must be made into butter or cheese of some kind, British or foreign. Again we repeat a periodical registration of the capital stock and debt liabilities of a public company is all the public can usefully demand.

Not growing wise by experience, the guardians of the poor of London seem determined to force the Government to supersede them, or at any rate to take from them all their most important administrative powers. The series of cases of cruel neglect of the sick and infirm poor brought home to the most important unions of the metropolis by the efforts of a private society, will quite outweigh the disinclination of the legislating public to interfere with local management. The London poor-law guardian system has been upon its trial, and has been convicted of incompetence, neglect, and cruelty. The infirmaries, the nurses, the medical attendance, all are a disgrace to the age we live in, and a disgusting commentary on the public philanthropic professions of numerous well-known parish patriots. We condemn emphatically the London poor-law union management, because it is well known that the majority of rural unions, under the control of a mixed body of guardians, elected and *ex officio*, are well arranged and conducted as far as the aged, the infirm, and the sick are concerned. One guarantee for this is, that the medical men in the country not officially connected with poor-houses exercise influence through their patients amongst the guardians. But it is not only the metropolitan Boards of Guardians who have proved unfit for their trust. The administration of the poor laws has turned out a failure. What is the use of the office at Whitehall, and the imposing staff of inspectors, with all their machinery of forms, if the abuses only discovered by the private agency of a philanthropic society could exist so long and so near the Head Centre? Mr. Villiers may be an old and trusted friend of his party, and may, in his rough, vigorous way, have done good service in the destructive part of his early duties; but is he not too inaccessible, too much under the influence of an infirm, irritable temper, to occupy advantageously a post requiring energy, tact, and discretion. One thing is certain, namely, that, putting humanity on one side, we cannot afford to have our labouring poor subject to the slow torture of these London infirmaries with their pauper nurses. It will be as well if some zealous and impartial persons will inquire into the condition of the pauper schools round London; the quality of education, literary and physical, bestowed on these friendless and helpless creatures. It is not long since ophthalmia raged for months through one of the largest of these schools, and then discoveries were made far from creditable to the management as to arrangements for checking contagion.

Startling claims and still more startling verdicts in cases of compensation for property required in the City of London for public improvements form frequent paragraphs in the local papers. At the present rate, the jury system for compensation cases must either be abolished or public improvements must cease. The fact is, that about one-fourth of the inhabitants of the City of London are, or have been within the last three years, under notice to be bought out. The result is, that at least every other juryman goes into the imaginary box with the idea or the knowledge that he or some near and dear relation is, or will be, or may be soon a claimant, and therefore he naturally thinks that a good liberal precedent, at the expense of the public rates or the private company, is the safe course for him or his relations. A private history of compensation cases would be nearly as scandalous as the records of the Divorce Court.

Circular to Gas Companies.

The passing of the Chartered Gas Company's Bill through the Commons by a majority of 31 in a House of 311 members, tellers included, is, we trust, an indication of recovery by the Legislature from the panic about the vicinity of gas-works which recently prompted the rejection of the Imperial and of the Equitable Gas Companies Bills, and prohibited in some other cases the erection of gasholders on land that was not scheduled in the Acts, within 200 and even 300 yards of any inhabited house. There can be no doubt that the authorities of the City of London nursed the panic by all the machinery they could set in motion, for the purpose of delaying the Bill of the Chartered Company, and thus affording them another opportunity of revivifying their own scheme in an amended form next session. The same means will probably be applied to delay the Bill in the House of Lords, and to enlist the

sympathies of the Bishops on behalf of those frequenters of Victoria Park who apprehend the possible contamination of the perfume of flowers by mingling with the smell of gas-works distant half a mile from the nearest point of the park palings. It is understood that the special Gas Committee of the Corporation is to be kept alive for another session, and that the machinery for agitating the question of corporation gas supply is to continue in operation in the hope that some change may take place in the disposition of Parliament regarding the scheme of confiscation, of which advantage may be taken next year. The most powerful part of the machinery of agitation is the press, and it is so easy to descant on the assumed grievance to the working classes of depriving them of the benefit of fresh air and of the sight of green trees and flowers, that, assuming those evils would attend the erection of gas-works at Hackney Wick, it can readily be shown that it would be great injustice to the inhabitants of the eastern part of London to destroy the beauty and freshness of Victoria Park. The *Standard* is highly indignant with the House of Commons for having passed the Bill, and declares that "the most gigantic nuisance London ever saw" is going to be set up just beyond the north-eastern boundary of the working man's park, and all for the sake of avoiding a repetition of the Nine Elms catastrophe, with a continuance of dear gas; and it is asserted that "the health and enjoyment of "thousands and tens of thousands of the industrial classes "will be thus put in jeopardy." This declamation is wanting in the essential requisite of truth. Ordinary observation of what is the effect of the vicinity of the large gas-works of the Chartered Company in Horseferry Road, would prove that there is in reality no foundation whatever for the indignation expressed at the assumed outrage on the enjoyments of the industrial classes. Practical daily experience proves that not the least inconvenience is felt from the proximity of those works to St. James's Park, within half the distance of the proposed gas-works at Hackney Wick to Victoria Park; and, as regards alleged injury to health, it is a well-known fact that the exhalations of gas-works, when they are sufficiently near to be perceived, are in many cases salubrious, and, in cases of consumption, one of the proposed cures by a distinguished French physician is to produce in the chamber of consumptive patients effluvia of the same character. The only possible objection that can really be made to the establishment of gas-works on the proposed site is, that the chimneys may be visible from a few points in the park, should the Metropolitan Board require them to be built of great height, and that is an eyesore which, in the neighbourhood of a manufacturing district, can scarcely be avoided. The objections raised to the Bill during the debate in the House of Commons exhibited the same affectation of sympathy for the working classes that formed the key-note of the article in the *Standard*, and some of the members, in their bids for popularity, staked their reputation for common sense and for knowledge of facts. The arguments of Mr. Tite, if worth anything, would go to the extent of removing all the factories already established in the vicinity of the park. By a perversion of logic he protested against the possible injury to the foliage, because the trees were already decayed by the factories in the district; and because the vegetation surrounding large alkali-works at Warrington had been destroyed by the emission of volumes of sulphurous acid gas from the chimney, he inferred that a similar effect would be produced by any kind of smoke. A more deplorable attempt to gain popularity by the sacrifice of common sense by a practical man was seldom witnessed. Mr. Cowper, the Chief Commissioner of Works, followed the track of Mr. Tite, and asserted that the vegetation in the park "had been extremely injured by many noxious manufactures "that are carried on in that neighbourhood;" and he apprehended that if the gas-works were erected on the Hackney Marshes the people would breath ammoniacal gas instead of fresh air. Lord John Manners likened the establishment of gas-works in the locality described by Mr. Cowper to a proposal "to stick them down" in Trafalgar Square; and Sir John Pakington preferred the claims of consumptive patients in the hospital not far distant to be spared from further nuisance. Sir John Trollope, the chairman of the committee on the metropolitan Gas Bills, made a manly defence of their report, and pointed out the absurdity of many of the objections that were raised to the proposed site at Hackney Wick. He accurately described it as "situated in the marshes below Hackney, and "that there is not a single residence within half a mile of the "spot. It is bounded on all sides by water; it is a marsh in "summer, and a sea in winter." He stated that when the committee visited the place they found all the trees in Victoria Park that had been planted were in a decaying state; not owing to gas-works, as might have been conceived from the speech of Mr. Tite, but from works for making vitriol, which were totally different. Sir John appropriately instanced the trees in St. James's Park as flourishing in much closer proximity to gas-works than Victoria Park is to the proposed works of the Chartered Company. He observed that it is quite obvious that the gas required for the consumption of London must be manufactured in the neighbourhood of London, and he challenged the objectors to the proposed site to find a better; stating, at the same time, that much more objection had been raised before the committee to the site chosen by the Corporation of London for their proposed gas-works than to the site near Victoria Park. Alluding to the efforts that had been made to get up a public demonstration against the Bill, Sir John Trollope said the committee were informed that at one of the meetings held for the purpose there were not twenty inhabitants of the neighbourhood present, and that the speakers misled the meetings to believe that the gas-works were to be established within the park itself, and it was under that impression that many of the signatures to the petition against the Bill had been procured. In the division, ten members of the committee voted in its favour, and two against it—viz., Alderman Lusk and Mr. Woods—who thus endeavoured to stultify the report. We observe, also, with regret, among those who voted in the minority, the names of Mr. Disraeli, Mr. Milner Gibson, Mr. Henley, and that of Mr. Butler, the chairman of the Commercial Gas Company, and representative of the Tower Hamlets, within which borough Victoria Park is situated.

The three celebrated tailors of Tooley Street, who constituted themselves an association professing to represent all the inhabitants of the United Kingdom, have had many imitators, and among them, in recent times, was the "London Gas "Consumers Association," consisting, we believe, also of three members—the chairman, the engineer, and secretary. Several attempts were made to puff the "association" into notice; offices were taken in New Bridge Street, Blackfriars, where subscriptions could be received and the business might be carried on, but the concern has just collapsed from the want of money to pay the rent. An action was commenced by the landlord against the engineer, and a verdict was obtained with execution in four days; but before the expiration of that brief term a deed and arrangement with his creditors was filed, giving a composition of 2s. in the pound, payable some months hence by two instalments of 1s. Three creditors signed the deed for £312 7s. 6d., and there is one non-assenting creditor for £78, who threatens to apply to have it set aside. The gas agitation trade is evidently not a thriving one, and the gas consumers of the numerous towns who, according to Mr. Flintoff's account, are indebted to him for saving them upwards of one hundred thousand pounds per annum, seem to be strangely ungrateful to their benefactor. It may be that they deny the benefit; but, be that as it may, it is quite clear from this case and from some others that might be adduced, that the talents and the time of the professional agitators for cheap gas might have been more profitably employed.

The Aldrington, Hove, and Brighton Gas Bill has passed the third reading in the Lords, and only awaits the Royal Assent to become law. The Brighton and Hove Bill was expected to be read the third time last night, and by that Act the Brighton public secure the supply of 14-candle gas at 3s. 6d. per 1000 feet, whether the Aldrington Company do or do not succeed in obtaining their requisite capital. Most of our readers can form their own estimate of the profit that price will yield with coal at 16s. per ton and a bad market for residual products; and many of them will, we doubt not, agree with us in opinion that it was inexpedient to accept the Act, under the circumstances of a threatened competition, by which the company are bound to that price for all time. This Act will be a serious blow to, if it do not ruin, the prospects of the Brighton companies, and the sooner they proceed to amalgamate, and thus economize as much as possible their expenditure, the better it will be, we conceive, for the shareholders and for the public.

The Wandsworth and Putney Gas Bill has had a narrow escape from being totally lost in the House of Lords after having been successfully carried in the Commons. The com-

pany sought by their Bill to increase their present capital of £30,000 to £100,000, and to extend their district so as to include the whole of the parish of Putney, Lower Tooting, Upper Tooting, Wimbledon, Merton, and Mitcham. The price at present charged for gas, if paid for within one month of the quarter, is 5s. per 1000 feet, and it was proposed by the Bill to reduce it to 4s. 6d. The Mitcham and Wimbledon Gas Company were the principal opponents of the Bill, as it would authorize the Wandsworth Company to invade their district, of which, though without parliamentary powers, they have hitherto enjoyed quiet possession. The same committee before whom the Brighton case was heard were induced to think that though it was proper to sanction the introduction of an entirely new gas company into that town, to compete with two established companies, it would be unjust to extend the limits of an existing company, established by Act of Parliament, into the adjoining district of a company that are not subject to any parliamentary obligations. So far, indeed, had their opinions of the injustice of competition become changed, that they resolved that it was not expedient to proceed with the Bill, and had that resolution been reported the Bill would have been altogether lost. Fortunately for the promoters, the House was not sitting on the day the resolution was agreed to, and the delay thus occasioned having allowed the committee time for reconsideration, they ultimately passed the bill, but struck out all those parts of it relating to the extension of the limits, and inserted clauses to satisfy all the opposing petitioners. Mr. Barlow was one of the witnesses called in support of the Bill, and in his cross-examination by Mr. Burke he was taunted with expressing opinions before the committee opposed to those advocated in the JOURNAL OF GAS LIGHTING. Mr. Barlow, however, vindicated his consistency, and stated that he had for years past advocated a well-regulated monopoly; that in all cases where gas companies exist only under deeds of registration, they should place themselves under parliamentary regulations; and that, until they have done so, any competing company would be justified in applying for an Act to establish competition—provided, of course, that it could be shown that the supply of gas was not satisfactory.

It is strange that, after such numerous warnings of the danger of remaining without statutory powers, so many gas companies should continue to run the risk of having to defend their positions at an expense three or four times greater than would be required to obtain an Act of Parliament. The good fortune of the Mitcham Company in the Lords and of the owner of the Brynmawr works in the Commons, in successfully resisting the invasion of their districts, cannot be relied on in other cases; and the most prudent course for those owners of gas-works who are without statutory powers to adopt, seems to be to sell them on the best terms they can obtain to the parties who may anticipate them in applying to Parliament. The Neath Company have not been fortunate, having failed in their efforts to throw out the rival Bill of the Neath New Gas Company in the Lords, and been compelled to accept the alternative of competition or a sale of their undertaking to their rivals on such terms as may be mutually agreed upon, or by arbitration under the Lands Clauses Consolidation Act.

As we purpose reprinting, in our next number, the share lists of gas and water companies, we earnestly request the assistance of our readers in rendering them as correct and complete as possible, by their returning us, on or before Thursday, the 5th of July next, the slips issued with our present number, so as to enable us to rectify any errors and fill up the omissions of the list published on January the 9th last; and that special advice may be forwarded to us of any changes that may have taken place in the paid-up capitals, dividends, or value of shares, of which notice has not already been transmitted to us. Attention to these is the more urged as numerous corrections reached us after the publication of the last lists, which would have been duly made had they been sent in sufficient time.

THE HARTLEY AUSTRALIAN CANNEL.—The seam is 5 feet thick, of which from 3 feet 9 inches to 4 feet is clean coal of the quality of the samples sent to England. The top and bottom of the seam consists of shale, lying horizontally, which yields about 60 gallons of oil to the ton, the rest being earthy matter containing "glossopteris." The seam runs through a mountain several hundred feet high, and lies near the base, whence it is worked to the rise by a tunnel. The rise is very small, the seam being very nearly level, consequently no machinery is required for drainage or haulage.

Communicated Article.

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ON A SUBSTITUTE FOR THE CANDLE EMPLOYED IN THE PHOTOMETRICAL EXAMINATION OF COAL GAS.

By W. W. FIDDES, Junr., Bristol Gas-Works.

For some years past it has been the duty of the writer to make daily photometrical examinations of the coal gas manufactured in the establishment with which he is connected.

It is well known to gas engineers that the variation in the rate of the combustion of the standard candle makes it necessary to take the mean of several observations, as the real photometrical power of the gas under examination. Accordingly, little less than half an hour is occupied in making each determination. The writer has therefore attempted to effect economy of time by replacing the candle by a constant photometrical standard.

After several devices had been abandoned, a contrivance suggested itself, which experiment proved to satisfy the required conditions. An ordinary Bunsen burner was substituted for the candle in the photometer now in general use, and an elongated curve of platinum wire, about an inch and a half in height, was fastened at each extremity to the tube of the burner. Sufficient gas is turned on to give a flame of constant height, and such a quantity of air admitted as will remove all luminosity. Under these circumstances, the incandescence of the wire immersed in the flame is found to be invariable for every variety of gas in ordinary use.

The writer, however, has been fortunate enough to discover a still more simple invariable standard.

In the course of some experiments made with a view of employing polarization for photometrical purposes, he noticed the fact that the same area of a flame in the same part of the flame has practically a constant photometrical value, no matter what gas is employed, so long as the gas does not fall below 10 candles power.

The flame employed in these experiments was the ordinary Argand, having a height of 3½ inches. This was surrounded by a brass chimney 2 inches in diameter and 8 inches high. At a height of 1¾ inch above the burner the cylinder was perforated by a circular orifice, having a diameter of ⅜ of an inch. The light issuing from this orifice is found to be equivalent to that emitted by one candle, as the following observations will demonstrate:—

Illuminating Power of the Gas experimented on.	Value of Light emitted from Orifice, expressed in Terms of 1 Candle.
13·00 candles	1·000
19·00 ,,	1·000
16·60 ,,	·985
12·64 ,,	1·000
17·80 ,,	1·005

Numerous other experiments have been made, with equally good results, but of which no record has been kept. The writer, therefore, hopes that he has succeeded in placing in the hands of the profession a means of effecting the economy of time which all confess is so much desired.

Correspondence.

BRITISH ASSOCIATION OF GAS MANAGERS.

SIR,—In answer to an inquiry during the discussion after the reading of my paper on the "Management of Small Gas-Works," I said that if £200 worth of gas were sold annually the works would pay. In your report you have printed £2000. Please correct this by inserting this letter, and oblige

THOMAS H. METHVEN.

Bury St. Edmund's, June 23, 1866.

Register of New Patents.

1507.—WILLIAM CLARK, of 53, Chancery Lane, London, engineer, for "*Improvements in the means of carburetting or treating aëriform fluids for lighting and heating purposes, and in apparatus for the same.*" A communication. Patent dated June 1, 1865.

This invention relates to improvements in apparatus for lighting and heating, for which letters patent were granted to the present inventor, dated Sept. 1, 1862, No. 2421. In the specification of that invention is described a method of converting air into gas spontaneously, without the aid of mechanism, by which air enters the apparatus at the ordinary pressure and comes in contact with essences of American petroleum or other light hydrocarburets contained in the said apparatus, afterwards passing out, still without pressure being applied thereto, to any desired point for giving light or heat.

According to these improvements, the apparatus is usually made of one or more flat reservoirs of cylindrical or other form, of tin, zinc, or sheet-

iron, and of suitable diameter. These chambers are superposed one over the other, and supported at a distance apart by means of tubes serving to partially fill the reservoirs with inflammable liquids or light essences of American petroleum, or benzine or other hydrocarburets. The several reservoirs communicate one with the other by means of lead or india-rubber tubes in such a manner that the air after passing over the surface of the liquid in the first reservoir, enters all the others in succession, and so becomes more and more charged with vapour, which is thus converted into gas for lighting and heating, afterwards passing out of the lower reservoir by a pipe for conveyance to the burner for consumption.

1695.—JOSEPH SOLOMON, of Red Lion Square, London, optician, for "*Improvements in the preparation of magnesium for illuminating purposes.*" A communication. Provisional protection only obtained. Dated June 24, 1865.

The object of this invention is to economize the consumption of magnesium ribbon or flat wire in lamps by burning it with zinc, tin, or other combustible metal. The difficulty hitherto experienced in burning these metals together is owing to the irregularity in the feeding up of two loose bands of ribbon. To avoid this, it is proposed to secure the bands of magnesium, zinc, tin, or other combustible metal or metallic alloy together either by an interlacing wire, thread, or textile material, and thus to make virtually one band, composed partly of a far cheaper combustible metal. This cheaper combustible material may be applied to one or both sides of the magnesium band, and instead of using an interlacing thread, eyelet-rivets or other fastenings may be employed.

1696.—CHARLES ROSS BAMBER, of Jersey, commander, Royal Navy, for "*A new or improved apparatus for producing the magnesium light.*" Patent dated June 24, 1865.

This invention relates to the construction of a new or improved apparatus, whereby the light from the metal magnesium may be produced in a continuous stream. The apparatus consists of an oblong case of wood or metal to contain the working parts. At one end of this case is arranged, in suitable bearings, a conical band or reel, around which the magnesium tape is coiled, and in the middle of the case a standard is fixed containing two friction-wheels placed one over the other, between which the tape is drawn from the barrel. The standard also supports, in bearings, a spring-barrel, from which rotatory motion is communicated to the friction-wheels; this spring is wound up by a key and secured by a paul and ratchet in the ordinary manner. An adjusting spring and screw is arranged to act on the upper friction-roller to regulate the speed of the take-off motion, and a hand lever is used, whereby the parts are set in motion and stopped. A guide is placed on each side of the rollers and another close to the reflector, in order to lead the tape from the barrel and through the reflector in part of the instrument, above which a funnel or ventilator is placed, and beneath or under the reflectors there is a second ventilator and an ashpan to receive the refuse of the burning magnesium.

1703.—CHARLES WORSSAM, engineer, of Commercial Wharf, Kingsland Road, and GEORGE EVANS, gentleman, of Gloucester Place, Portman Square, London, for "*An improved pulping and compressing machine for the treatment of peat as a fuel and gas for illuminating purposes.*" Patent dated June 26, 1865.

This machine consists, firstly, of a rotary horizontal table of iron of great strength, having a number of boxes in it in the form of a brick. Each box is lined with metal plates finely perforated, and each has a piston or plunger with a perforated top and a wheel at bottom. This plunger or piston runs on a circular inclined tramway in the form of a horizontal screw of one thread, so that as the table revolves, the plungers or pistons are raised and fall in the boxes, and are pulled down by means of a cam at the bottom. Each box is provided with a perforated cover, which slips off and on, with a wheel attached to its upper surface, which works in a fixed cam as the table rotates. The horizontal circular table is firmly held in its position by powerful side-brackets, each provided with rollers placed in opposition to all counter movements, the under-rollers supporting the table by a rim, which is again pressed on from above by the upper rollers. There are also side-rollers to the brackets to keep the table in steady working gear while it rotates.

2. The pulping and feeding apparatus, which is fixed over these boxes, consists of an iron cylinder with a vertical shaft, having knives attached and placed at angles, so that as the knives move round, the fibres of the peat are forced through the different plates and then broken up, so that the whole body of the material is well reduced to pulp. It is then propelled downwards by an eccentric feed motion into the boxes in the horizontal table. The covers close by means of an upper cam, and the table is moved by steam or other motive power, with suitable gearing. As the table revolves, the plungers respectively rise up the circular inclined tramway, and gradually compress the peat and force out its contained water through the perforations. The pressure being completed, the boxes pass consecutively under the cam and open the plungers or pistons, then rise over a sudden incline and force out the compressed block, after which the plunger lowers and passes under the pulping and feeding apparatus. By this means the boxes are refilled, the covers closed, and the rotation of the table continued.

1724.—PAUL JACOVENO, retired Russian naval officer, of Bucharest (Wallachia), momentarily of 11 and 12, Panton Square, Coventry Street, London, for "*Improvements in decantations and raising petroleum and other oils, and in apparatus therein employed.*" Patent dated June 28, 1865.

This invention consists of certain hydraulic apparatus which cannot conveniently be described without the aid of drawings. The patentee claims for it several advantages on the score of simplicity of construction, durability, and rapidity of action.

1732.—GEORGES LIZARS, gas-meter manufacturer, of 36, Rue Lafayette, Paris, for "*Improvements in dry gas-meters.*" Provisional protection only obtained. Dated June 29, 1865.

The diaphragm or partition of dry gas-meters, which move by the pressure of gas, are joined together by leather, which requires an air-tight and firm means of attachment. This invention consists of an improved means of securely fixing the cords or bands which bind this leather on to the ring which surrounds and holds the diaphragm, and of making the joint round the edge of the diaphragm perfectly tight, so avoiding leakage. For this purpose, the metal ring on which the leather rests is formed with a groove around one of its edges. This groove receives the last turn of the cord or twine after it has been bound over the leather, and the edge of the groove is turned over on to this last turn, so that the metal surrounds and holds the cord firmly and prevents the binding which holds the leather from stretching either by reason of the pressure of the gas or from any other cause.

1737.—WILLIAM SCHOFIELD, of Heywood, Lancaster, manager of the Heywood Gas-Works, for "*Improvements in the manufacture of gas-retorts, and other articles made of fire-clay, and in furnaces for burning the same, and for other purposes.*" Patent dated June 30, 1865.

In manufacturing gas-retorts, it has heretofore been customary to mould and cast them in solid fire-clay mixed with ground burnt fire-clay or other material, and such retorts when in use were very liable to contract and to crack. Now this invention consists in moulding and casting the retorts, with a number of perforations distributed over the surface, or the perforations may be made after the retort is moulded. The retorts are then burnt in the usual manner, or according to these improvements as hereinafter described, and the perforations are then filled up with burnt blocks of fire-clay and cement. The invention also consists in securing the mouthpieces of retorts to the retorts by screws taking into threads formed of and in the fire-clay. The improved mode of manufacturing retorts of fire-clay with perforations above described, is also applicable in making crucibles, fire-door tiles, baffle-plates, and other articles of fire-clay that are exposed to great variations of temperature. The improvements in furnaces consist in making the furnace-bars to rotate or oscillate on their axes, to prevent the adhesion of clinkers and injury to the bars, and to promote the combustion of the fuel The bars are cylindrical, or with projections and recesses, so that in revolving or moving the space between them remains about the same. The ends of the bars are connected by pinions, or by a worm and wheels, so that they may all be moved simultaneously, or they may be moved individually by hand without gearing.

The body of the retort is moulded or cast of mixed burnt and raw fire-clay in the ordinary manner, but the outer case of the mould is made with perforations corresponding in number and position to the perforations required in constructing the retort according to these improvements. The perforations are made by preference all over the surface of the retort, the number and diameter of the perforations may be varied. When the retort is being moulded over a short core of the usual construction, it is customary to remove the outer case and the inner core, and to leave the portion of the retort thus moulded for several days, in order that the fire-clay may have time to set before the next portion is added. When the fire-clay is being rammed in, the air which is combined with it escapes through the perforations in the mould, thus increasing the solidity of the retort, the clay also exudes partly through the perforations in the outer mould or case, and the perforations are made through the retort by forcing a hollow cylindrical instrument, made of very thin iron or steel, through the perforations in the mould, and through the fire-clay. The cylindrical blocks cut out by the perforating instrument or other blocks are burnt in a kiln, and serve as plugs to fill up the perforations. Or the perforations may be made conical, and taper plugs fitted into them; it has heretofore been customary to keep the upper portion of the fire-clay of the partially formed retort moist, by means of wet rags, but these wet rags may be dispensed with. The instrument consists of a sheet-metal trough or cap, of the shape of the retort; this cap is put on the top of the partially formed retort as soon as the portion has been moulded, and by excluding the atmosphere the fire-clay retains its desired moisture for adhering to the fire-clay that is rammed into the mould after the core has been moved to form the next portion of the retort. When the whole retort has been moulded, and the perforations made in it as described, it is burnt in a kiln of the usual construction, or provided with the improved furnace hereafter described. The cylindrical blocks or portions of fire-clay that are cut out to form the perforations in the retort are also burnt in a suitable furnace, and they are afterwards cemented into the perforations to make the retort perfectly tight. These blocks may fill up the whole length of the perforation, or only part thereof; and, if preferred, a thread may be tapped in the fire-clay, and the plug may have a thread cast on it. In this case the plugs would be screwed into the retort. When a compound core of the entire length of the retort, as described in the specification of letters patent granted to Orlando Brothers on the 19th day of August, 1847, No. 11,840, is employed, the outer mould or case is made in lengths, and with perforations as before described. The retort is moulded by ramming the fire-clay into each length in succession continuously, without allowing one portion of the retort to dry before the next portion is added; the perforations are then made when the whole retort is moulded. Retorts constructed in the manner above described may be used, in generating gas, without supports in the gas-furnaces, such retorts being so much stronger than those of the ordinary construction that they will bear their own weight from end to end when made of the usual length. Instead of making the perforations in the retort by forcing an instrument through the holes in the outer case, the outer case may be constructed as usual, and the perforations made in the retort after the outer case and inner core are removed.

The following is the improved mode of securing the mouthpiece to the end of the retort. When the retort has been moulded, and the fire-clay has had time to set, but before it has been burnt, six or other convenient number of holes is made in the body of the fire-clay forming the end of the retort, and these holes are then tapped until a perfect screw-thread is formed in and by the fire-clay, and into these threads, when burnt, the set screws are screwed, thus holding the mouthpiece securely against the end of the retort, or a screw-bolt may be imbedded in the fire-clay when being moulded, and screwed out afterwards, thus leaving the hole screwed. This improved mode of securing the mouthpiece to the retort may be applied to retorts of the ordinary construction. The length of the screw-bolts is by this means so much reduced that the expansion of the bolts does not break the joint of the mouthpiece, and the

bolts are not injured by the heat. Crucibles are made by placing raw and burnt fire-clay within the mould, the core is then introduced and gradually forced down by a lever, or other equivalent, to compress the fire-clay between the core and the mould; this pressure on the core causes the surplus fire-clay to exude into the perforations in the mould, but in order to consolidate the clay forming the crucible it is preferred to place the mould in an outer sheet-metal case, which would prevent or moderate the escape of the exuding fire-clay. When the crucible is moulded as above described, and the outer case removed, the requisite holes are made in the crucible by means of a thin metal tube, as before described, the core is then taken out, but before the crucible is taken to the furnace to be burnt it is desirable to make the perforations slightly conical, and this can be done by introducing into the holes a taper plug from the inside of the crucible; when the crucible has been burnt these conical holes are filled up with conical blocks, and by this means cement the plugs, which cannot be forced out by the pressure of the melted metal in the crucible. The improvements applicable to furnaces for generating steam, and to other furnaces, consist in a frame for the fire-door, the lower part of which supports the front ends of the fire-bars, a similar support being provided for them near the bridge; the fire-bars are shown round, but they may be made with projections and recesses. To each fire-bar is fixed a pinion, and all these pinions gear into a worm, to which a slow rotary motion is imparted, by any suitable gearing or by hand; by this means the fire-bars are turned gradually round on their axes, thus preventing injury by the adhesion of clinkers, and promoting the combustion of the fuel. The pinions and the worm are protected from the dust and cinders by a guard, cast or fixed to the frame, or secured in any other convenient manner. In some cases the worm and pinions may be dispensed with, and the fire-bars turned round occasionally by the attendant; in this case each fire-bar is made with a square hole, in which a key is introduced, or the pinions may all be geared into each other, or an oscillating motion may be given to the bars instead of a rotary one. To the door is fixed a fire-resisting tile, which is made with plugged-up perforations, as described in reference to the gas-retort and crucible. The patentee observes that, although he has only shown and described his improved mode of constructing articles of fire-clay, in order to prevent them cracking and breaking, as applied to retorts, crucibles, and fire-door tiles, yet it is evident that these improvements are applicable to every other article made of fire-clay that may be exposed to intense heats and to great variations of temperature. The claim is for—first, the improved mode described of manufacturing articles of fire-clay, or fire-clay combined with other materials, and the apparatus shown and described when employed for that purpose; secondly, the modes described of making screw-threads in articles of fire-clay; and, lastly, the improved furnace described with rotating or oscillating grate-bars.

1749.—James Atkins, of the firm of Robert Walter Winfield and Co., of Birmingham, merchants and manufacturers, for "*Improvements in the manufacture of certain kinds of metallic tubes and rods, and in ornamenting metallic tubes and rods.*" Patent dated July 1, 1865.

This invention consists firstly, of the following improvements in the manufacture of the kind of tubes known in commerce as "patent tubes," *i.e.*, tubes of iron having an open or unwelded joint and coated or covered with a thin brass tube. The improvements consist in preparing the iron tube with a flux, such as chloride of zinc, which enables it when immersed in a bath of melted tin or soft solder, to take a coating of the said tin or solder, and after having placed the brass tube on the tube so prepared, plunging them again in a bath of melted tin or soft solder to take a coating of the said tin or solder. By this treatment the space between the iron and brass tubes becomes filled with the tin or solder, and the compound tube thus formed may be dipped like an ordinary brass tube without injury from the acid, which in tubes of this kind, as ordinarily manufactured, is retained between the two tubes and slowly corrodes them. Rods of iron may be coated with brass in the same way. When it is required to prevent the outside of the brass tube from being coated with the tin or soft solder, it is covered with a thin coating of whiting or pipe-clay. The second part of the invention consists of certain improvements in ornamenting metallic tubes or rods.

1780.—Hermann Beigel, of Finsbury Square, London, for "*Improvements in the means of obtaining or producing oxygen applicable to various useful purposes.*" Provisional protection only obtained, Dated July 6, 1865.

In performing this invention it is proposed to take a concentrated or saturated solution of chloride of lime, to about 100lbs. of which is added about half an ounce of oxide or salt of nickel or cobalt, the result of this admixture at a temperature of 80° Reaumer being, that chloride of lime is decomposed into chloride of calcium and oxygen, the oxygen being eliminated and set free from the lime. If the process is effected in a closed vessel, a tube or pipe will conduct the gas as required. It is also proposed to mix the ingredients in the dry state, and to eliminate the oxygen from the lime by the addition of water, so that the powder may be packed and rendered easily portable and ready for use.

1818.—George Thomas Livesey, of the South Metropolitan Gas-Works, Old Kent Road, in the co. of Surrey, for "*Improvements in treating ammoniacal liquors for purifying gas and other purposes.*" Patent dated July 10, 1865.

These improvements consist firstly in a new method of removing the sulphuretted hydrogen from the ammoniacal or gas liquor resulting from the distillation of coal or other material used in the manufacture of illuminating gas, and thereby producing a liquor capable of acting as a purifying agent for the gas so made. The desulphuration of the ammoniacal liquor is effected by collecting the gases produced by the combustion of fuel (or the like gases from any other source) from the chimney shaft or flues leading from furnaces thereto, which gases are ordinarily allowed to escape into the atmosphere, and drawing or forcing the same by means of an exhauster or other suitable apparatus through or into contact with the foul gas-liquor which may be contained in a vessel similar to the ordinary scrubber, wet lime purifier or washer such as is used in gas-works, or any other contrivance whereby the necessary amount of contact can be obtained. The result of this operation is to deprive the foul gas liquor of its sulphuretted hydrogen, and this is done without removing more than a trace of the ammonia. The liquor having been thus desulphurated, is now converted into an active purifying agent, and readily removes the sulphuretted hydrogen from the crude gas upon its being applied through the agency of scrubbers or other suitable apparatus. The carbonic acid may be removed from the gas by desulphurating the liquor as before described, and then heating it, by which means the greater portion of the carbonic acid in combination with it is driven off; and the said liquor then becomes suitable as an agent for the removal of both sulphuretted hydrogen and carbonic acid. The process of heating the liquor has the effect of driving off with the carbonic acid a portion of the ammonia; but this is readily condensed, and is a very valuable product.

For the purification of illuminating gas, it is proposed to pass the gas through four purifying vessels or scrubbers; the first and second with desulphurated liquor, the third with the weak desulphurated liquor which has been heated to remove the carbonic acid if required, and the fourth with water only, to remove the last traces of impurity. It has been found that about one gallon of the desulphurated liquor properly applied is sufficient to purify 100 cubic feet of gas. Secondly, the adoption of the foregoing process of desulphurating liquor which is of great use in preparing it for conversion into the various ammoniacal compounds, and liquor ammonia of various strengths.

The desulphuration of the ammoniacal liquor may be effected by substituting atmospheric air for the gases; but the latter are preferred, on account of their greater efficacy.

The sulphuretted hydrogen and small quantity of ammonia driven off in the process of desulphuration are passed through or in contact with water, whereby the ammonia is absorbed and its loss prevented, while the sulphuretted hydrogen is conducted into the chimney-shaft or burnt in the retort-furnaces. By adopting this process, most of the objectionable emanations produced by the manufacture of gas in the ordinary way are avoided, the purification being performed entirely in close vessels, and the noxious products consumed.

The claim is for the desulphuration of gas liquor wholly or in part containing ammonia and sulphuretted hydrogen, by bringing the liquor into contact with the gases produced by the combustion of fuel, or the like gases from other sources, by and in the manner substantially herein described.

1833.—Hector Auguste Dufrené, of 10, Rue de la Fidélité, Paris, civil engineer, for "*An improved process for obtaining oxygen.*" A communication. Provisional protection only obtained. Dated July 11, 1865.

The object of this invention is to employ oxygen for industrial purposes, and as it does not exist in a commercial state, to obtain it economically. When a current of dried chloridric acid and air is passed over pumice-stone at a red heat in a suitable apparatus, decomposition of the acid takes place, the hydrogen unites with the oxygen of the air to form water, and azote and chlorine, which may be easily separated, can be collected; when, on the contrary, a mixture of chlorine and water steam is passed through a tube heated to red heat, decomposition again takes place, but in this instance the hydrogen combines with the chlorine and oxygen is set at liberty. The furnaces employed for these operations may vary in form according to circumstances. No claim is laid to any kind of furnace which may be employed. It will be easily understood from the preceding reaction that a very large quantity of azote is eliminated in the operation. To utilize this gas it is passed over iron in a spongeous state, heated to a red heat, by which the azote is absorbed.

1834.—Nathaniel Jenkins, of Boston, Suffolk, Massachusetts, U.S.A., for "*Improvements in steam and water valves.*" Patent dated July 11, 1865.

This invention relates to certain improvements in steam valves and water cocks of that description in which rubbers or other suitable elastic valves or packings are employed and its nature consists—

1. In confining the elastic valve or packing to the follower, or to a swivel connected with the same by means of a flange, and the corresponding socket in the end of the said follower or swivel, so that the valve or packing may be readily inserted or removed.

2. In attaching an elastic valve or packing to the end of a plug or swivel pivoted to the follower, so that the latter when being screwed downwards forces the said valve or packing on to its seat; the follower will turn on the swivel, and the valve or packing have no axial motion, and, consequently, no rubbing grinding friction on the seat, and will thus be rendered much more permanent and durable, and less power will be required to open and close the same than would be the case if it turned on its seat.

3. In the employment of a compressible rubber or other suitable elastic spring, so constructed and arranged as to answer the threefold purpose of a spring, a packing for the cup, and a valve, thereby producing a very cheap and simple self-closing faucet, and one in which the water-hammer is almost entirely prevented.

4. In opening a self-closing valve by means of a screw follower whose threads are so inclined that the pressure of the water and the spring will be sufficient to rotate it and thereby close the valve, while at the same time, by means of the said inclined screw, it will be easy to open the valve and hold the same open so long as it may be required to let the water run.

5. In the employment of an adjustable stop or regulator in combination with the follower of a steam-valve or water-cock, to prevent the elastic packing from being injured by too much compression, and also to determine when the same shall have been screwed down sufficiently.

6. In arranging the waste-pipe with its inner orifice in the bottom of the valve-chamber cup above the valve, so that when the latter is opened its top will rise up to and close the said orifice; and when the valve is shut the waste water, or the water in the pipe above, will flow off and be prevented from freezing.

1841.—HARRISON BLAIR, of Kearsley, Lancaster, manufacturing chemist, for "*Improvements in the production of gases from aqueous vapour, and in the application thereof to heating purposes.*" Patent dated July 12, 1865.

This invention has for its object the economical production of combustible gas from aqueous vapour, which may be used for the heating of dwelling-houses, or for manufacturing or other purposes where heat is required. It consists in producing such gas by forcing a mixture of aqueous vapour and atmospheric air through a fire of coke or coal, whereby the said vapour becomes decomposed. The apparatus for carrying out this invention may be varied in form.

1861.—WILLIAM ROBERT LAKE, of 8, Southampton Buildings, Chancery Lane, London, for "*Improvements in flexible gas-tubing.*" A communication. Provisional protection only obtained. Dated July 15, 1865.

This invention consists first, in the application of glue, or a composition of which glue or other gelatinous substance is the principal part, to form a coating, lining, or stratum for flexible gas-tubing, in order to make such tubing impervious to illuminating gas or its fluids; and secondly, in covering the exterior surface of flexible tubing with cloth or flock to improve the appearance of the said surface. The glue may be dissolved in water with about one-third of molasses, honey, or glycerine, to preserve the glue in a flexible state, and it is applied when hot.

When this glue or composition is used as a lining or inner coating for the tube, it may be poured into, so as to fill the said tube, and after remaining long enough to form a film or coating of the desired thickness, the residue of the said glue or composition may be poured out therefrom. To cover or coat the outside, or to saturate the tube, the glue or composition may be applied either with a brush or by dipping the tube into a trough or other reservoir containing the same. When tubing has an exterior covering of cloth or india-rubber, such covering is either put on while the glue is adhesive, or is secured by means of india-rubber cement put on over the glue when it is dry. In applying flock to the outside of the tube, a solution of gum, india-rubber, or gutta-percha, is employed, which forms a cement of about the consistency of paint prepared for use. This cement is put into a reservoir, and the tube immersed therein. Before the cement is dry the tube is "flocked" in any suitable manner, so as to give it a uniform coating. As soon as the first coating has become set, the tube is covered with a second coating of cement, and then with a second coating of flock. When the latter has become set, the tube is immersed for about 15 seconds in a bath of nitric acid of the ordinary commercial strength, and then immersed for about 30 seconds in a moderately strong solution of chloride of lime. It is then twice again alternately immersed in the nitric acid and lime water, in the same order and for the same time as before. The india-rubber being vulcanized by the action of the said acid and lime water, the tube is said to be cured.

1864.—RICHARD ARCHIBALD BROOMAN, of 166, Fleet Street, London, for "*Improvements in pumps.*" A communication. Pated dated July 17, 1865.

This invention consists in constructing rotary pumps in manner hereafter explained. The pump is formed of a circular metal box, with two branches, one for the discharge and the other for the suction of the liquid. Two covers close the box on each side, and recesses are made on the inner face of the cover to receive two discs. In the centre of the box there is a cylindrical box, the length of which is equal to the breadth of the box, but its radius is only about two-thirds of the opening of the box. Two perpendicular apertures are made through the box, in which two blades or pistons are free to slide. The length of these pistons is equal to the radius of the box and that of the boss. Upon one quarter of its circumference the boss is tangent to a curved plate, one of the ends of which is cut at right angles, while the other diminishes gradually in thickness in a curvilinear form. The curved plate fills entirely one quarter and partly another quarter of the space existing between the boss and the inner surface of the box. Liquid enters at the end of the curved plate cut at right angles, which intercepts its passage and compels it to run round the boss and travel through the empty part of the box. The exit of the water takes place through a channel into which an orifice made in the hollowed and diminishing part of the curved plate opens. The liquid in running round the boss in the box meets the end of the pistons, and its passage is intercepted by one of them for a quarter of the circumference of the box; but the boss rotated by means of a crank-handle, or otherwise, causes a partial vacuum in the suction-pipe, draws in the water and forces it out through the exit-channel. The pistons as the reach successively the fixed parts of the curved plate are pushed on one end into the boss and out at the other end to continue the effects above described. The alternative and successive to-and-fro motion of the pistons which take place by the rotation of the boss, draw in the liquid and force it out in a continuous jet.

1866.—JOHN PAUL BAUGH LE PATOUREL, of 11, Garden Reach, Calcutta, for "*Improvements in ventilators.*" Patent dated July 18, 1865.

This invention consists of certain arrangements of pipes and valves forming a system of ventilation for ships, factories, &c., which cannot be clearly described without the assistance of diagrams.

1875.—THOMAS METCALF, HENRY METCALF, and THOMAS CLAYTON, all of Manchester, for "*An improved apparatus for cooling liquids and cooling or condensing vapours or gases.*" Provisional protection only obtained. Dated July 19, 1865.

In a cistern through which water circulates is placed a zig-zag or serpentine pipe, formed of thin metallic plates, and at the top of the said pipe is fixed a nozzle or aperture for the entry of the liquid, vapour, or gas to be cooled, and at the bottom is an opening and pipe leading to the exterior of the cistern for the exit. The sides of the pipe are made flat, the space between them being as narrow as the area of the supply will allow, and one side of the lower part of the zig-zag pipe is encased in a chamber open at the top, and connected at the bottom to the cold water pipe for supplying water to the cistern. The liquid, vapour, or gas to be cooled enters into the nozzle or aperture at the top of the flat pipe, through which it passes, and escapes through the exit-pipe at the bottom of the cistern. The cold water enters the chamber and impinges with force against the lower part of the flat pipe, and then passes upwards in contact with the said pipe to the top of the cistern, which is there provided with a waste pipe for taking off the surplus water, and as by the use of the flat pipe there is a large area of cooling surface, and the matter to be cooled passes inwards in a thin stream, the cooling takes place very effectually, owing to the way in which the cold water is introduced.

1879.—CHARLES NICHOLAS, of Cheltenham, plumber, for "*A new or improved apparatus for supplying disinfecting liquids to water-closets, urinals, and other places requiring the same.*" Provisional protection only obtained. Dated July 19, 1865.

The principal parts of the apparatus are situated in a cistern or reservoir, in which the disinfecting liquid to be used is contained. At the bottom of the reservoir is a small closed chamber which acts as a measurer, into which the liquid passes to the water-closet. This measurer is alternately filled and emptied by means of a suitable arrangement of mechanism.

1915.—MATTHEW PIERS WATT BOULTON, of Tew Park, Oxfordshire, for "*Improvements in obtaining motive power when heated air or aëriform fluid is employed.*" Patent dated July 22, 1865.

For producing motive power according to one part of this invention, by means of heated gases or aëriform fluid, air and inflammable gas or fluid in proper proportions are forced at high pressure into a cylinder in which a piston works. The piston having moved through a certain space, the inflammable mixture is ignited, and the expansive force thus produced acts on the piston. In this case the induction valve or valves are kept cool without difficulty, no heated gases passing through them. The eduction-valve is also kept cool without difficulty, provided the heated gases are so cooled by performance of work during expansion as to be discharged at low temperature. This can be done by increasing the pressure and the expansion. If the temperature of the heated gas is so high that it cannot be reduced as low as is desired by performance of work under the degree of pressure and expansion which is used, then a certain quantity of steam may be admitted into the cylinder, reducing the temperature of the fluid used to such an extent that it is reduced by performance of work done to the degree desired. The compression of the gases which constitute the inflammable mixture may be produced by a pumping or forcing apparatus, or they may be generated under pressure.

To prevent the action of the heated gases on the eduction-valve before their temperature is reduced by performance of work, fluid is interposed between them and the valve in a passage between the cylinder and the valve. Water may be used for this purpose, which may be injected into the passage after the eduction-valve is closed, or may be introduced previously. The valves may also be cooled externally by water. The cylinder-rods and other parts may be cooled so far as is desired by water externally applied. The heat imparted to the water may be used to generate steam, which steam may be used in the cylinder.

1918.—WILLIAM EDWARD GEDGE, of the firm of John Gedge and Sons, of 11, Wellington Street, Strand, for "*An improved windmill for raising water.*" A communication. Provisional protection only obtained. Dated July 22, 1865.

The utility of this improved mill consists in raising water to heights more or less elevated according to requirements, and afterwards using the water by causing it to fall into a hydraulic wheel which will drive agricultural machines, and for various agricultural purposes, washing troughs for example; also in case of fire; and for ornamental purposes in using it for fountains and ornamental water.

1940.—SAMUEL LUSTY, of Walworth, Surrey, machinist, for "*Improvements in fluid-meters.*" Provisional protection only obtained. Dated July 26, 1865.

In carrying out this invention, a cylindrical chamber or barrel is employed, at the bottom of which is placed a straining-receiver, into which is let the ingress-pipe above the strainer, and at the lower end of the barrel is fixed a double-threaded screw, between the threads of which the fluid enters the barrel; above this screw is mounted a revolving drum, with fins and flanges on its periphery; this drum fits the barrel with tolerable accuracy, and is hung upon a spindle whose lower bearing is in the centre of the fixed screw, and the upper end of which terminates in a worm which drives a reducing train of wheels which work the indices of the dial fixed upon the top of the meter. Above the revolving drum, and hung free upon the same spindle, is a second drum, through which the fluid passes off to the exit-pipe.

The action is as follows:—The fluid entering the straining-receiver by the ingress-pipe is filtered by the strainer, and is forced through the threads of the fixed screw, by which it takes a rotary direction into the fins or flanges of the revolving drum, which it drives round, and with it the spindle upon which it is fixed, and through this spindle actuates the train of wheels by which the registry is made upon the dial-plate; the fluid then passes off the revolving drum into the second drum, through a small hole in the bottom of it, and this second drum filling, the fluid passes through holes in the side of this drum, and filling the barrel, passes off through the exit-pipe.

1958.—WILLIAM EDWARD NEWTON, of 66, Chancery Lane, London, civil engineer, for "*An improved water-meter, which may be employed as a water, steam, or gas engine.*" A communication. Patent dated July 28, 1865.

The improved wet meter or engine which forms the subject of the present invention consists of a group of any number of cylinders (four by preference), each provided with a piston and arranged around a central axis of rotation. These cylinders are open at their lower ends, and in their revolution round their axes they pass in succession over an induction-way to receive the water or other fluid, which actuates and raises the pistons in the cylinders. The cylinders then pass over an eduction-way, through which the water or other fluid is discharged and the pistons descend. The pistons are connected by rods, with a plate mounted on a slab on the arms of a hub, which turns on an axis placed at an angle with the axis of the group of cylinders.

The claim is for the application of a cluster of cylinders, capable of revolving about a common centre, provided with pistons, in combination with an inclined plate (or the equivalent thereof), with which the piston-rods are connected, and with the bed-plate and its induction and eduction ways, for the purpose specified; also (in combination with the cluster of cylinders and bed-plate), surrounding the cluster of cylinders with a case, and making the eduction aperture or port to discharge into the case, for the purpose described.

1968.—Ferdinand Küp, of Frankfort-on-the-Maine, gentleman, for "*Improvements in gas-burners.*" Provisional protection only obtained. Dated July 29, 1865.

The object of these improvements in gas-burners is to offer a ready means for regulating the illuminating effect of either bat's-wing, fishtail, Argand, or other similar gas-burners, by regulating exactly the quantity of atmospheric air to be admitted to the gas-flame. For this purpose the burner is provided on the outside with a moveable jacket, socket, casing, or cap, having one or more openings through which either the gas-flame or the entire top or part of the top of the burner may be caused to protrude, provision being made for allowing the setting of the said jacket, socket, tube, casing, or cap at any required height, and thus allow more or less air to be admitted to the flame, and thereby regulate the intensity of this latter, and according to the nature of the gas and amount of pressure. By preference a male screw thread is cut on the outside of the burner, which screw enters into a corresponding female screw thread provided in the inside of the jacket, socket, tube, casing, or cap; or this latter may be arranged in such manner as to allow of its gliding gently over the smooth outer surface of the burner; or, in fact, any other suitable mechanical arrangement may be resorted to that allows of regulating at will the position of the opening or openings of the jacket, socket, tube, casing, or cap in respect to that of the slit or slits, hole or holes, or other openings of the burner through which the gas takes its exit.

1980.—Alfred Vincent Newton, of 66, Chancery Lane, London, mechanical draughtsman, for "*An improvement in refining petroleum and other hydrocarbon oils.*" A communication. Patent dated July 31, 1865.

This invention relates to the refining of petroleum and other hydrocarbon oils by filtration through animal charcoal, sometimes termed bone-black, wood charcoal, or other filtering medium. The filter may consist of a vessel of wood or iron, of any suitable form and size, but preferably of cylindrical form, and having a diameter about one-fourth of its height, open at the top, and perforated closely at bottom with small holes. Over the perforated bottom of this vessel is placed and secured a layer of cotton, cotton-cloth, or other fibrous material, to prevent any particles of the filtering material from passing through the perforations; and above this layer the vessel is about half filled with animal or wood charcoal, or other filtering material.

The oil to be refined or purified is poured in at the top of the filter, which may be kept filled. After filtering through charcoal or other filtering material, the oil passes through the under layer of fibrous material and the perforated bottom into a suitable receptacle.

Petroleum or other hydrocarbon oils filtered in this manner will be light in colour, have very little odour, and be suitable according to its density for the purposes of lubrication or illumination. Oils distilled from coal should preferably be redistilled once in the ordinary way before filtration, as above described. Petroleum may be subjected to such filtration either in its crude or natural state or after distillation.

1996.—James M'Ewan, engineer, and William Neilson, builder, both of Glasgow, in the co. of Lanark, N.B., for "*Improvements in the raising, lifting, or drawing and forcing of water and other liquids, and in the apparatus and means employed therefor.*" Patent dated Aug. 2, 1865.

These improvements, the details of which cannot be intelligibly described without the aid of drawings, are comprised, first, in a certain construction and arrangement of apparatus or mechanism for the purpose of raising, lifting, or drawing and forcing of water and other liquids; second, the application and use of high-pressure steam in the form of thin conical streams or angular circular jets, caused to pass through narrow or fine slits of the same shape, formed round and through the body of conducting-pipes, so as by the direct action and force of the steam to draw, raise, and force water or other liquid in a constant stream through the full bore of the said pipes.

2008.—John William Perkins, of 41, Norfolk Street, Strand, London, analytical chemist, for "*The purification or refining of hydrocarbons or paraffin oils.*" Patent dated Aug. 3, 1865.

This invention consists in oxidizing the crude oil obtained by the destructive distillation of coal, shale, peat, or other bituminous bodies, and treating the resulting products as hereinafter described.

In a suitable vessel fitted with agitating machinery there is placed a quantity of crude coal oil, or other hydrocarbon or paraffin oil, the temperature of which is raised by a steam-coil to about 100° Fahr., after which about 1-10th per cent. of nitrous acid or nitric acid, or 1 per cent. of nitrate of soda or nitrate of potash is added, and the agitator having been put in motion for a few minutes, there is added from 3 to 4 per cent. of sulphuric acid, the whole being maintained in a state of motion for about half an hour, according to the quantity operated upon, by which means the sulphur present in the oil is converted into sulphuric acid, and the oil to some extent deoxidized. After one hour's repose, the tar and carbonaceous matter, having settled down, must be drawn off, together with the acid, and the clear oil passed into another vessel, and washed with water holding in solution about 1 per cent. of caustic soda, having a specific gravity of 1·334, and jets of steam, and then conveyed into any convenient distilling apparatus, furnished with syphon-cocks at the worm or refrigerating end, and distilled *in vacuo*. The permanent gases generated may be used as fuel to the stills, or for the purpose of illumination, whereby the escape of offensive vapours is prevented.

The oil thus obtained must be redistilled, and about two parts of chloride of zinc or chloride of calcium added to it, and about a quarter per cent. of oxide of amyle (the fusil oil of commerce) may also be added. The distillate, having a mean specific gravity of ·832, must be again treated with from 3 to 4 per cent. of sulphuric acid and washed with a solution of caustic soda, and then submitted to a further distillation, which is continued until oil of a mean specific gravity of from ·810 to ·820 is obtained, which may be further treated with 3 per cent. of sulphuric acid, and afterwards washed with a weak solution of caustic soda to remove any sulphurous acid that may be present.

The oil which is distilled over after the oil of the specific gravity of ·832 has been obtained, and which is too dense for illuminating purposes, must be treated with 3 per cent. of sulphuric acid and washed with a weak solution of caustic soda, and the paraffin scales having been removed by filtration the oil is to be combined with a fresh portion of crude oil, in the proportion of about 1 to $\frac{3}{4}$ of crude oil, and treated in the same manner as the crude oil is hereinbefore directed to be treated; the proportion of sulphuric acid being regulated according to the quantity of carbon present, and for which particular purpose the acid from the last operation may be again used.

The claims are—

1. The mode of treating crude hydrocarbon or paraffin oils at a temperature of about 100° Fahr., by means of certain oxidizing agents in actual combination with and used in conjunction with sulphuric acid, but the patentee does not confine himself to the use of nitrous acid, nitric acid, or any other soluble nitrates.

2. Combining the heavy oil with a fresh portion of crude oil, as described, and also the use of the soluble chlorides mentioned in connexion with sulphuric acid for the conversion of any sulphur that may be present in such oils into chloride of sulphur.

2020.—Adderley Sleigh, of 12, Upper Belgrave Place, Eaton Square, Middlesex, for "*Producing a rotary self-acting new motive power by the employment of buoyancy, gravity, and hydraulics through the agency of fluids, gas, and solids separately or combined.*" Patent dated Aug. 4, 1865.

This invention is not described apart from the drawings.

2021.—William Clark, of 53, Chancery Lane, London, engineer, for "*Improvements in apparatus applicable as a motive-power engine, a pump, or fluid-meter.*" A communication. Patent dated Aug. 4, 1865.

This invention relates to an improved rotary engine, which may also be used as a pump, meter, or blowing apparatus. This apparatus may be variously arranged, its chief feature consisting, firstly, in the employment of an eccentric as a piston and for communicating motion to the driving-shaft; secondly, in the arrangement of the slide-valve, which serves both for the admission of steam into the cylinder and for forming an abutment in the said cylinder (the slide-valve may be variously arranged, and may work in a slide or may be made to oscillate); and thirdly, in an arrangement for producing a constant and perfect contact between the slide-valve and the eccentric so as to prevent concussion, and at the same time considerably to reduce the extent of the dead point.

2040.—Adolph Millochau, of the city and State of New York, U.S.A., for "*An improvement in stills for the distillation of petroleum and other oily substances.*" Patent dated Aug. 15, 1865.

This improvement relates to a double distillation in a double still for combining and utilizing the heavy and light products of the distillation of petroleum or similar oils, and producing an oil of a medium gravity adapted for burning.

2043.—Adrienne Anastasie Foubert, of St. Helier's, Jersey, for "*Improvements in apparatus for regulating the passage or flow of steam, water, and other fluids.*" Patent dated Aug. 7, 1865.

This regulator consists of a chamber in which works a piston. The inlet-aperture is at the end of the chamber and the outlet at the top. The chamber may be made of any desired shape, whether round, conical, or oblong, as found most convenient. By pressure being exerted upon the piston it is caused to open or close more or less the exit-aperture. This piston is made steam, water, and air tight, by metallic springs, hemp-packing, vulcanized india-rubber, or other suitable material, and there are two metal rods for communicating a to and fro motion to a slide-tube placed in the chief tube. This slide-tube can be connected to the piston in different ways. The motion of the slide-tube is regulated according to the pressure of the steam, water, or other fluid passing through. A helical or spiral spring, which is free to expand or contract according to the pressure of the fluid, rests upon a flange and washer at the back of the piston. A set-screw regulates the size of the exit-aperture, the outer end of which is made by preference hexagonal, to receive a spanner for turning the same. A needle united at one end to the piston traverses the centre of the helical or spiral spring, and a pressure-screw indicates the atmospheres as well as the size of the exit-opening, on a graduated and moveable plate at the other end. A strap, attached by a screw to a cap, is fixed over the end of the piston-rod to keep the exit-aperture full open when required. The steam, water, gas, or other fluid entering the chamber presses against the piston and causes it to descend, thereby compressing the spring. The piston in its motion draws with it the sliding-tube and thus tends to close the exit-opening, when the pressure on the piston decreases the spring expands, and driving the piston back opens the exit-aperture, and thus at varying pressures a regular and even supply of fluid is maintained.

2055.—Thomas Goode Messenger, of High Street, Loughborough, in the county of Leicester, hydraulic engineer, for "*A new portable machine or apparatus for the cutting of screw-threads on pipes or on solid materials, and for the cutting of pipes asunder.*" Provisional protection only obtained. Dated Aug. 8, 1865.

This machine consists of a frame having a hole on each side, through each of which holes is passed a flanged pipe, its flange being about the centre of the length of the pipes, and it is secured to the frame by screws passing through the flanges into the frame, or the pipes may be screwed into the frame itself. The portion of each pipe which stands within the frame is tapped with a screw-thread, and upon these pipes a cylinder is free to turn, tapped at each end to receive the screwed ends of the pipes.

This cylinder has two or more chambers at the side, in each of which a cutter or chasing tool is free to slide, the distance between the points of which is regulated by a clamp, which has a right and left hand screw at one end, and is arranged so as to be turned by a hand lever or some equivalent contrivance. One of the first-mentioned threaded pipes has at its upper end chambered projections through which pass the stems of a pair of V clamps, the outer ends of the stems of which are held by a clamp-frame in such a manner that the clamps may be moved nearer to or further from each other by means of a screw. These V clamps are employed for placing and receiving the pipe, rod, or bar on which a thread is required to be cut in the centre of one of the first-named screwed pipes. The other screwed pipe is provided at its outer end with a cone, or its equivalent, which receives the end of the pipe to be operated upon. The chambered cylinder before mentioned is provided at one end with a spur-wheel, the teeth of which gear into and slide in a smaller wheel which forms part of or is connected with a bevel-wheel, which is moved by another wheel actuated by a hand-winch. The machine is provided with legs to stand so that it may be used either upon the ground or upon a bench.

By this machine a screw-thread may be cut perfectly true with the pipe—*i. e.*, the cutters are always at right angles with the pipe, and a particular thread, sharp and deep, can be given both as "plug" and "taper." By this machine a screw-thread can be cut upon the end of a pipe without conveying it to a fixed lathe or other screw-cutting machine, as this machine or apparatus may be conveniently carried about, as required. The same arrangement of machinery and apparatus is also applicable for the cutting of pipes asunder.

2094.—Henry Woodward, of Cannon Street, in the City of London, gas engineer, for "*Improvements in gas-burners.*" Provisional protection only obtained. Dated Aug. 12, 1865.

In this invention there is formed, on the top of the burner, at each side of the orifice, a grooved arm, and suspended to each arm there is a rod or pin carrying a small piece of glass, the groove in each side being for the purpose of spreading the flame, and the bead of glass for keeping the flame steady. There is also formed in the chamber a valve, having grooves in its surface, so that when the gas is turned on it shall press the valve to the seating, and only allow the gas to pass through the grooves, and thus regulate the quantity of gas to be consumed with great certainty and efficiency.

2095.—Henry Woodward, of Cannon Street, in the City of London, gas engineer, for "*Improvements in carburetting coal gas, and manufacturing artificial gas, and in the machinery or apparatus employed therein.*" Patent dated Aug. 12, 1865.

This invention consists, first, in improved apparatus for carburetting ordinary coal gas, for the purpose of increasing its illuminating power; and, second, in the manufacture of artificial gas, and in the machinery and apparatus connected therewith.

A vessel or chamber is employed, of a circular, oval, semi-circular or semi-oval, or other form, composed of suitable metal or material, in which is placed a number of perforated plates, covered with cotton wicks or other material, capable of acting with capillary attraction, which plates rest upon a horizontal plate above the bottom of the vessel or chamber, thus leaving a space, which is filled with naphtha or other hydrocarbon, supplied by an inlet-pipe at the exterior of the vessel. At the centre or side of the vessel there is a tube connected with the supply of ordinary coal gas, which tube encloses another tube in a telescopic manner, the second tube having at the bottom a disc carrying one or more floats for enabling the disc to float in the naphtha or other hydrocarbon. When the bottom of the vessel is filled with naphtha or other hydrocarbon, the cotton wick or other material becomes saturated with the liquid by capillary attraction, and thus exposes a very large extent of area of liquid, from which the volatile gas evolves; and, when ordinary coal gas is supplied to the vessel through the telescopic tube, it incorporates with the gas evolved from the liquid, and forms a compound gas, possessing a very high illuminating power, which gas is passed from the vessel, through the outlet-pipe, to the burners.

In the manufacture of artificial gas, similar vessels are employed to those before described, each containing perforated plates and absorbing material, and also naphtha or other hydrocarbon. Atmospheric air is supplied to such vessel by means of an improved blower, instead of the ordinary coal gas, which air incorporates with the volatile gas evolved from the large area of liquid, and forms a compound artificial gas, which, when ignited, burns with great brilliancy and power.

The improved blower is constructed in the following manner:—In bearings formed in any suitable standards or frames, shafts or spindles are placed, which are mounted with a train of toothed wheels and pinions put in motion by a clock or box spring. On one of the shafts is fixed a crank and friction-wheel, and a crank is employed for working the bellows or blower. The friction-wheel is acted upon by a lever used as a break, the pressure of which can be regulated with great nicety by means of a screw and nut, or a rod connected to the break-lever, thereby regulating the speed of the shaft which carries the crank, and consequently the blower; or the arrangement is varied by employing a rotary fan, or blower, which is caused to revolve at any required speed by means of a box-spring and train of wheelwork; and in both cases, when required, the box-spring is dispensed with, and any other description of motive power is employed.

When the vessel is supplied with hydrocarbon and the blower wound up, the volatile vapour is evolved, and the current of air produced by the blower is incorporated with it, thereby producing a compound artificial gas, which ascends to the burner, and when ignited burns with a brilliant flame. When desired to warm the air, it is admitted through an aperture near to or surrounding the burners, or passed through a spiral or serpentine pipe directly below the burner.

2111.—James Billings, of Kentish Town, in the co. of Middlesex, accountant, for "*Improvements in ventilators.*" Patent dated Aug. 16, 1865.

This invention consists in fitting in a space between two plates, one set in a line farther back than the other, a single plate held in frames, free to move in a centre. The ends of this plate extend beyond each of the other fixed plates, and these ends may be bevelled. When, to allow of ventilation, the moveable plate stands midway between the fixed plates, and air enters both above and below the moveable plate, then, to shut off the air, more or less, the moveable plate is turned in the centre of the frames which hold it, to or towards the fixed top of the outer plates.

2128.—Nicholas Charles Szerelmey, of 90, Belgrave Road, Pimlico, London, gentleman, for "*Improvements in the manufacture of paper boards and pipes.*" Patent dated Aug. 17, 1865.

Heretofore, in the manufacture of paper boards and paper pipes, they have been made by pasting or otherwise connecting several layers or thicknesses of paper together, and, in some cases, the paper so used has been saturated or combined with tar. According to this invention the paper employed is first prepared by being saturated by one or other of the three compounds hereafter mentioned, and the sheets or pieces of paper are then combined or cemented together in any number of layers, according to the purpose to which the boards or pipes are to be applied, by means of a cementing compound composed of the following substances or matters mixed in about the following proportions—viz., one ton of coal tar, one ton of French siccatif, half a hundred weight of zopissa (which is found in Arabia and also in America), one hundred weight of fibrous pulp, such as is used in making paper, and one hundred weight of glue dissolved in 60 gallons of water.

In preparing this compound the coal tar is heated to a boil, the French siccatif and the zopissa are stirred in and mixed, then the pulp and glue are added, and all are well combined. In preparing the paper which is to be used according to this invention, if it be very soft and very porous, it is saturated with a solution of the following salts—one part by weight of chloride of calcium, one part by weight of acetate of lime, and 20 parts of water. If the paper is less soft and porous, it is saturated with a solution composed as follows—silicate of potash and artificial sulphate of baryta in equal parts, in about 16 parts of water. These two solutions may be applied in succession to the same paper in those cases where the paper, after being saturated with the first solution, is found, after being dried, still capable of absorbing water. Other papers are saturated with the following compound—anhydrous gypsum and caustic potash in equal parts or proportions, in about 10 parts of water.

The paper having been well saturated in either of these compounds or solutions is, when dry, suitable for carrying out the invention, and any number of sheets or layers may be cemented or combined together by the compound above described, which is spread over the surfaces of the prepared paper in like manner to that in which paste or other cement has been used in producing paper boards or paper pipes.

2167.—John Newton, of Preston, in the co. of Lancaster, civil engineer, for "*An improved gully or stench-trap for the prevention of the escape of noxious effluvia from drains or sewers, and for preventing the ingress of sand or other solid matters into the same.*" Patent dated Aug. 23, 1865.

The object of this invention is the construction of gullies or stench-traps which will be more effective in operation and more convenient for fixing and refixing than gullies or stench-traps hitherto adopted. The invention consists of the following parts:—First an iron grating with a hopper attached thereto or cast therewith, which reduces evaporation to a minimum in summer, and prevents freezing of the contents of the "sludge-box" in winter, which said hopper rests in the socket of the "sludge-box;" on the side of the "sludge-box" is cast or attached a syphon arm or branch forming a complete trap, through which the water passes into the drain, the said stench-trap being operative at all times, whether the "sludge-box" be full or empty, and can be readily cleared out with a scoop should such operation be necessary. On the upper part of the syphon-trap is an opening fitted with a moveable stopper so as to facilitate inspection or flushing of the sewers or drains.

2179.—Giacomo Bagnagatti, of Leicester Square, London, for "*An improvement in gas-burners.*" Provisional protection only obtained. Dated Aug. 24, 1865.

This invention has reference to an improvement in gas-burners with a view of increasing the illuminating power of the gas, and ensuring greater economy in the consumption thereof than hitherto, and consists in the employment in connexion with the upper portion of the said burners of a turn or loop of galvanized platinum wire, which will compress the current of gas and diverge or spread the flame, and at the same time effect a combination of the hydrogen with the oxygen, and develop caloric to such a degree that the platinum, becoming in an incandescent state, will increase the combustion of the hydrogen.

2184.—Edwin Augustus Curley, of 11, Amwell Street, Clerkenwell, London, mechanical engineer, for "*Improvements in appliances by means of which certain liquids, common air, and certain elastic fluids are made available in the production of light, and their quantity regulated and measured, part of which improvements are applicable for other purposes.*" Provisional protection only obtained. Dated Aug. 25, 1865.

When it is required that air or other elastic fluids shall be made to pass through pipes, tubes, or chambers for the purposes of this invention, the quantity and pressure which are required to be used are moderate, a rotating drum is employed, resembling the measuring-drum of a wet gas-meter. This drum is surrounded with a case, which is provided with an inlet and outlet for the air. The central orifice and the inlets and outlets of the several chambers of the drum are sealed or luted with liquid in the usual manner, and an inverted syphon is used either on the inlet or the outlet side of the drum. A train of wheels and pinions, or a train of pulleys, being actuated with the axle of the drum, and this train set in motion by a weight or spring or other suitable power, the drum is made to revolve, and consequently to draw the air through the inlet of the case on the one side, and to force it through the outlet on the other side. The pressure is made uniform by a regulating air-chamber and valve at the inlet. The air is thus made to flow with regularity through any pipe or chambers properly connected with the drum-case.

For the purpose of lighting and heating, it is necessary that the air should be strongly impregnated with vapours of gases of a highly inflammable character. If this be desired, porous or fibrous diaphragms may be inserted within all the chambers of the drum. They will consequently revolve therewith, and being immersed in the inflammable liquid with which in that case the apparatus is partially filled, and being afterwards exposed to the air in every revolution of the drum, a sufficient evaporating surface is obtained, and the air is impregnated with the inflammable material to the desired extent.

2191.—JOHN MOULE, manufacturing chemist, of 391, Hackney Road, London, for "*An improvement in the treatment of tar and other substances to be used as paint, and for other purposes.*" Patent dated Aug. 25, 1865.

This invention consists in the use of substances which, by proper combination, form a liquid suitable to supply the place of oil, turpentine, and other liquids generally used in the manufacture of paint. The invention consists in the use of Stockholm tar in combination with gums and resins dissolved in some suitable solvent, such as ether, alcohol, pyroxylic spirit, or wood naphtha, methylated alcohol, and other distillates, the product of vinous fermentation, as follows:—To 100 parts by weight of methylated alcohol is added 40 parts of gum sandarac, or a similar proportion of other suitable gums or resins, which are allowed to dissolve, the solution being aided by a suitable agitation. With this solution is mixed by agitation 40 to 60 parts of good Stockholm tar; this forms the liquid for mixing with the colouring substance, producing a good and durable paint, well adapted for coating iron where exposed to damp.

2195.—JOHN FORDRED, of Blackheath, in the county of Kent, gentleman, for "*Improvements in the treatment of certain products obtained in the refining of petroleum and of other hydrocarbon oils.*" Provisional protection only obtained. Dated Aug. 26, 1865.

In the refining of petroleum or of oils obtained from the distillation of coal, shale, or peat at low temperatures, known in commerce as coal, shale, or peat oils, it is usual to add sulphuric acid to the crude or the distilled petroleum or oils as a preliminary process for refining the same. Upon such addition of sulphuric acid, a product is separated which is technically known as acid tar or foots. There is another process for the purification of the before-mentioned oils, which has been secured to the present inventor by letters patent, dated February 28, 1865, No. 564, in which a preliminary alkaline treatment is substituted for the acid process now generally employed, and from which also a product is obtained, called alkaline tar or foots. It is to the treatment of these two products or residues, and to the utilization of the products resulting therefrom, that the present invention relates.

In the treatment of the acid tar or foots, in order to liberate and obtain the oils and other compounds in combination with the acid, there is added either caustic alkali or alkaline earth or alkaline carbonate or alkaline earthy carbonate, either in solution or in a state of division, and having effected the neutralization of the acid and the liberation of the oils and other compounds previously in combination, the oils are freed from the saline matters by the addition of a small proportion of water and the injection of steam. After allowing the saline solution or the deposit to subside, the same may be removed from the supernatent oils or freed compounds in order to effect the liberation of the oil or compounds in combination with the acid, or contained in the acid tar as before mentioned.

Into the alkaline tar or foots obtained as described in the before-mentioned patent, and after admixture of this tar or foots in suitable proportions with the addition of a small quantity of water, steam is to be injected, and the freed oil is to be separated from the saline solution as before described. The oil or compounds thus separated will be found to be suitable for useful purposes in art.

In addition to these products thus obtained, those oils or compounds which result from the neutralization of the alkaline tar or foots by means of the acid tar or foots as described in the before-mentioned patent, also possess similar properties, and they are therefore included in the several applications herein mentioned. These oils are found to possess valuable drying properties, and may be advantageously employed in conjunction with boiled oil and with such resinous gums and resins as may be soluble therein; and they may be further employed in conjunction with any of the before-mentioned substances, together with pigments, as paints or varnishes.

When the before-mentioned oils are subjected to distillation with the intervention of steam, the whole or a portion of the distillate may be employed as the basis of superior varnishes and paints and for other useful purposes in art. The solution of the sulphates of the alkalies resulting from the neutralization of the acid foots either by means of an alkali or by means of the alkaline tars or foots as before mentioned, may be evaporated and the salts obtained, as is well understood.

2199.—ROBERT GORDON RATTRAY, of Aberdeen, M.D., for "*Improvements in apparatus for supplying regulated or measured quantities of water.*" Patent dated Aug. 26, 1865.

A vessel of a capacity for containing the desired quantity of water to be delivered at one time is employed, and water is supplied to this vessel through a tube leading to the top of a vessel. In the tube is a valve opening upwards. The stem of this valve may pass up through a stuffing-box, and be connected to one arm of a lever, which lever is carried by a standard from the top of the standard or vessel; or it may be otherwise coupled with the said arm of the lever, so as to move in unison therewith. To this arm of the lever is attached a counterbalance weight, which tends to bring the valve on its seat and close the inlet into the vessel. When the opposite end of the lever is held down, this valve is lifted off its seat, and then the water flows through the inlet-pipe and fills the cistern, the air in the cistern being allowed to escape through a passage formed through the top of the vessel, which passage is closed as soon as the vessel is filled by a valve which is caused to rise and cause the opening by a float connected to it.

At the bottom of the cistern is an outlet closed by a double valve, one valve—a small one—being employed to close an opening through the other and larger valve; the smaller valve is connected to the larger valve in such manner that, after the smaller valve has risen a short distance, any further upward motion acts on the larger valve and raises it also. The smaller valve is connected to a rod which rises up through a stuffing-box in the top of the cistern, and the upper end of the rod is connected to the opposite arm of the lever to that to which the inlet-valve is connected, so that, when the inlet-valve is open, the outlet-valve is closed, and *vice versâ*. The arm of the lever to which the outlet-valve is connected is ordinarily held down, so that the outlet-valve is closed, and the inlet-valve opened to allow the water or fluid to fill the vessel; when, however, this end of the lever is no longer held down, the counterbalance weight on the opposite arm of the lever depresses this arm, and by so doing closes the inlet-valve and opens the smaller outlet-valve; this allows a small quantity of fluid to pass away through the outlet, and so relieve the interior of the vessel of pressure, and allows the counterbalance weight, by further descending, to raise the small valve higher, and so open the larger outlet-valve, and allow the whole of the contents of the cistern to flow away. When the end of the lever to which the outlet-valve is connected is again depressed, the outer valves are closed, and the inner valve again opened.

2220.—WILLIAM HENRY GUMMER, of Rotherham, in the co. of York, for "*An improved stench-trap and sink-pipe protector.*" Patent dated Aug. 29, 1865.

The top or head of the sink or other pipe is formed or provided with a socket or cup-shaped enlargement, having a projecting flange on the upper edge which supports a flat or slightly dished plate, the central part of which is perforated or formed into a grate, and is provided beneath with a short trumpet-shaped tube; the lower end of this tube dips into a cup suspended in the centre of the socket or cup-shaped enlargement at the head of the pipe. The lower edge of the trumpet-shaped tube dipping into the cup makes a water-joint, and effectually prevents the return of any stench, whilst the cup itself retains any solid or other matter which might be likely to stop the pipe; at the same time it allows any liquid or other matter not likely to stop the pipe to flow freely over its edge and pass down the latter.

2252.—THOMAS LOMAS, of North Shields, Northumberland, alkali manufacturer, for "*Improvements in the separation of sulphide of iron from coal and carbonaceous matter.*" Provisional protection only obtained. Dated Sept. 1, 1865.

The object of this invention is to utilize the refuse of coal-pits containing a mixture of sulphide of iron and coal, and commonly called "brasses." It has heretofore been customary to separate the sulphide of iron and coal by hand, or by the aid of machinery and water; but these methods have been found incomplete and expensive. This invention consists first in breaking the "brasses" into small pieces by means of suitable machinery, and then allowing them to fall into a cistern containing a solution of chloride of calcium or other liquid of such a specific gravity as will allow the coal to float and the sulphurous compounds to drop to the bottom of the cistern. The separation being thus effected, the coal is removed from the surface, and the sulphurous compounds from the bottom, by any suitable mechanical contrivance.

2259.—CHARLES HORSLEY, of Wharf Road, City Road, London, civil engineer, for "*Improvements in meters or apparatus for measuring water or other fluids, partly applicable for exhausting air or other gases.*" Patent dated Sept. 1, 1865.

In carrying out this invention a drum or cylinder is employed, which is mounted upon an axis, revolving and placed eccentrically within a case or chamber. The ends of the drum or cylinder revolve in contact with the ends of the drum-case or chamber, being provided with suitable packing to prevent the passage of the water or other fluid between them, the edges or circumference being also packed if required. The drum is furnished with moveable valvular flaps or slides, which in their revolution (acting either by their own gravity or by means of an eccentric, cam, or other mechanical means) fall over or are projected outwards against the inner circumference of the drum-case, in the space formed between the drum and the case, the valvular flaps or slides thus forming measuring-chambers in their revolutions between the inlet and outlet passages, and also serving as blades or vanes for the pressure of the water or other fluid to act upon and impart motion to the revolving drum. The valvular flaps or slides are closed or withdrawn in their movement against the inner side of the drum-case, the eccentric space being closed at one point by the drum and flaps revolving in close contact with the inner surface of the drum-case. One or both ends of the axis of the revolving drum or cylinder pass through stuffing-boxes in the ends of the drum-case, and suitable counting apparatus is connected therewith in order to indicate the number of revolutions made by the drum, by which the quantity of water or other fluid passed through is ascertained.

The apparatus above described is also suitable for being arranged and employed (by giving motion to the axis of the eccentric drum) for the purpose of exhausting air or gases.

2270.—STEPHEN KETTLE, of 41, Goswell Street, Clerkenwell, London, for "*Improvements in water-closet apparatus, urinals, and the like, and appliances thereto.*" Patent dated Sept. 4, 1865.

This invention relates to water-closets, urinals, and the like, and consists of certain improvements in the form and construction of the valves and other parts of the apparatus or fittings used therein.

2305.—JAMES WEBSTER, of Birmingham, Warwickshire, engineer, for "*Improvements in hydropults and hydrostatic pumps.*" Patent dated Sept. 8, 1865.

These improvements in hydropults or apparatus for throwing water or other fluids consist in the employment of a single barrel divided in mid-length into two parts, the lower receiving the pump-bucket, and the upper forming an air-chamber. The improvements in hydrostatic pumps consist in the employment of a cylinder with a convex top and concave bottom, and a small air-pump attached at one side, and at the opposite side an eduction-pipe or jet. At the top of the cylinder is fixed a valve attached to a hollow copper ball, so that in filling the cylinder with water to a given height the ball should rise and close the valve. The air-pump being then worked air is compressed into the space above the

water and by its expansion forces the water through the jet in a continuous stream until the cylinder is empty. A stop-cock is attached to the jet, so that the cylinder having been charged may remain for any length of time, when by turning the stop-cock it may be used without further labour. The cylinder is charged with water at the top of the valve.

2308.—Alexander Mackie, of Warrington, Lancaster, newspaper proprietor, and James Paterson, of the same place, engineer, for "*Certain improvements in the method of lighting gas, and in apparatus connected therewith.*" Provisional protection only obtained. Dated Sept. 9, 1865.

This invention relates to the lighting of jets of gas which are not readily accessible, such as in high gas-lamps, signal-lights, or in subterraneous passages, or turrets, and is designed to effect a ready means of ignition of gas in such situations as may be inconvenient to reach.

The improvements consist in the application and use of a tube extending from any place which may be convenient for ignition to the jet required to be lighted. This tube is to be perforated with small orifices close together, and extending from end to end of the tube, and is to be supplied with gas, which is controlled by a tap. When it is required to light the jet in an elevated position, the gas thereto is turned on, and it is also admitted to the perforated tube. If a light be now applied to the perforations at the accessible end of the tube, the light will pass in small jets along the perforated tube to the jet requiring ignition, and communicate thereto, after which the gas supplying the perforated tube is to be turned off until again required.

2372.—William Esson, of Ness House, Cheltenham, Gloucestershire, for "*Improvements in the construction of gas-meters.*" Patent dated Sept. 16, 1865.

This invention relates to certain improved mechanical arrangements to be used in the construction of gas-meters, and is based upon an invention for which the present patentee obtained letters patent on the 27th of August, 1858, No. 1942.

According to one modification of this invention, instead of placing the air-tube on the outside of the filling-tube as formerly, it is in this instance placed in the plate forming the bottom of the formation especially arranged for its reception, a portion being raised to some distance above the lowest level of this plate, so as to leave the bottom of the air-tube with free access to the water and gas. The seal-tube is fixed to the top of the meter-case in the usual manner, and dips to the bottom of the fountain, a depth sufficiently low to ensure the seal, the upright spindle passing through the tube into the compartment of the meter below the fountain by means of a hole in the fountain-plate, the difference between the levels of the bottom of the air-tube and seal-tube constituting the seal.

By means of this arrangement the necessity for fixing the seal-tube into the lower fountain-plate is obviated, as well as the screw-joint for holding it, and much simplicity of construction is thereby effected.

2415.—Alfred Bird, of Birmingham, Warwickshire, experimental and pharmaceutical chemist, for "*Improvements in purifying water.*" Patent dated Sept. 21, 1865.

These improvements consist of a method of precipitating the lime or a portion of the lime, together with organic colouring matters contained in the water to be purified, by means of a solution of sulphate of alumina or sesquisulphate of aluminum in the manner described.

2419.—Charles Wyatt Orford, of Lifford, King's Norton, Worcestershire, engineer and architect, for "*A new and improved machine for the collecting and diffusing of water or other fluids.*" Provisional protection only obtained. Dated Sept. 23, 1865.

The object of this invention is the collection and diffusion of water or other fluids by means of a machine consisting of a cylinder fitted with a piston, the water or other fluid being admitted on each alternate side of the piston by means of a four-way tap or cock, the alternate opening and shutting of which is effected by means of a slide-rod connected with and joined on to the piston-rod. The piston-rod is made so that if it requires to travel further than the piston itself, it moves through the piston for any required distance, its further course being arrested by means of stops placed on the rod above and below the piston for that purpose. By this means the plug of the tap is turned at each successive stroke. Provision is made for a continuous stream by having the cylinder partly surrounded by a closed air-vessel, which is connected with the delivery-pipe in the usual way. It is proposed to work the machine either by hand or other motive power, as may be requisite.

2435.—John Henry Johnson, of 47, Lincoln's Inn Fields, London, gentleman, for "*Improvements in generating illuminating gas, and in the machinery or apparatus employed therein.*" A communication. Patent dated Sept. 23, 1865.

This invention relates principally to the construction and arrangement of apparatus or machines for making illuminating gas, by forcing atmospheric air or hydrogen or carburetted hydrogen gas or air, mixed with one or other of such gases, through the light and volatile hydrocarbon fluid which forms the secondary products of the distillation of coal, or the oils emanating from coal or petroleum. Apparatuses of this kind are generally composed of an air-forcing apparatus and a vaporizer combined for operation, so as to produce a steady flow of air well charged with hydrocarbon vapour. This, however, can only be effected by apparatus or machinery too voluminous to admit of portability or of application to railway carriages or other like vehicles.

This invention consists in so combining and arranging a gas apparatus, with a view to compactness and portability, that the same may be used for illuminating purposes as a fixture in railway carriages and other vehicles, or as a lamp or moveable and portable apparatus in houses, on board ships, and in other situations.

In carrying out this invention two conditions are requisite—first, that the air or other gases shall be forced or drawn through the volatile hydrocarbon liquid by a mechanism the operation of which shall not be sensibly affected by the movement to which the apparatus may be subjected; secondly, that the air or other gases shall be so forced or drawn through a column of volatile hydrocarbon liquid of such a length, equivalent to height, as will ensure the perfect saturation or charging of the air or other gases with hydrocarbon vapour. For this purpose an air-pump is combined with a vaporizer, consisting of a hydrocarbon fluid reservoir, provided with a funnel-shaped bottom which terminates in a pipe. This pipe may or may not be coiled, but in its extremity is turned upwards and is connected with an air-chamber provided with a double-acting diaphragm air-pump, operated by any convenient arrangement of spring-power or clockwork mechanism. Valves for the admission and expulsion of air or other gas to and from the air-chamber, are so arranged that at each stroke of the pump air or other gas is admitted into the air-chamber and forced out through the pipe or coil into the fluid reservoir, whence it escapes through another pipe or pipes leading to one or more burners.

APPLICATIONS FOR LETTERS PATENT.

1584.—Jenkin Jones Ingram and George Richard Phillips, both of the Stuckton Iron-Works, Fordingbridge, in the co. of Hants, engineers, for "*Improvements in valves for regulating feed suction and other purposes.*" June 9, 1866.

1593.—Samuel Lees, of Salford, in the co. of Lancaster, manufacturing chemist, for "*Improvements in furnaces for consuming petroleum and other hydrocarbons.*" June 12, 1866.

1594.—Thomas Joseph Leigh, of 7, Lansdowne Cottages, Denmark Street, Camberwell, in the co. of Surrey, civil engineer, for "*Improvements in the method of burning coals (whether large or small coals), coal dust, coke, coke dust, charcoal, wood, and other combustible substances, as also hydrocarbons and gases, and in the arrangement of the furnaces applicable thereto.*" June 12, 1866.

1600.—James Nicholas, of Aspull, near Wigan, in the co. of Lancaster, oil refiner, for "*Improvements in retorts, and in the mode of working the same to obtain crude paraffin and other oils from cannel coal, bituminous matter, wood, peat, bones or other material.*" June 12, 1866.

1607.—James Alexander Forrest, of Liverpool, in the co. of Lancaster, stained glass manufacturer, for "*Improvements in the construction of lanterns.*" June 13, 1866.

1615.—George Dunbar Malam, of Halifax, in the co. of York, gas engineer to the Halifax Corporation, for "*The purifying of ammoniacal liquor by an improved process, and the application of such purified ammoniacal liquor to the purifying of coal gas.*" June 14, 1866.

1628.—Benjamin Franklin Stevens, of 17, Henrietta Street, Covent Garden, in the co. of Middlesex, gentleman, for "*A new or improved method of treating permanent inflammable gases, whereby greater heat is obtained therefrom.*" A communication. June 15, 1866.

1636.—George Henri Marc Muntz, of Birmingham, in the co. of Warwick, manufacturer, for "*Improvements in the manufacture of certain fittings for gas, steam, and water tubes.*" June 16, 1866.

GRANTS OF PROVISIONAL PROTECTION.

416.—James John Shedlock, of 6, Shaftesbury Villas, Kensington, in the co. of Middlesex, gas engineer, for "*Improvements in gas-burners.*" Feb. 10, 1866.

1338.—Orlando Brothers, of Blackburn, in the co. of Lancaster, gas engineer, for "*Improvements in governors or apparatus for regulating and controlling the pressure and flow of illuminating gas or other gaseous fluids.*" May 10, 1866.

1468.—Ernst Büchner, of Frankfort-on-the-Maine, Germany, for "*Improvements in the manufacture of gas.*" May 25, 1866.

1470.—Baldwin Fulford Weatherdon, of 77, Chancery Lane, in the co. of Middlesex, civil engineer and patent agent, for "*Improvements in gas pyrometers, which may also be employed as thermometers.*" A communication. May 26, 1866.

1488.—David Duff, of Litchfield Street, Soho, in the co. of Middlesex, gas engineer, for "*Improvements in gas-regulators applicable to burners and meters.*" May 28, 1866.

1522.—John Henry Johnson, of 47, Lincoln's Inn Fields, in the co. of Middlesex, gentleman, for "*Improvements in the deodorizing of crude rock or mineral oil, and in the preparation of lubricating oil therefrom.*" A communication. May 31, 1866.

1525.—Henry Edward Newton, of 66, Chancery Lane, in the co. of Middlesex, mechanical draughtsman, for "*Improvements in the construction of water-cocks or hydrants.*" A communication. May 31, 1866.

1552.—Desiré Alfred Dumuis, sanitary engineer, Elmir Jean François Flicoteaux, sanitary engineer, Edward William Niblett, mechanical engineer, and Manuel Leopold Jonas Lavater, manufacturer, all of 29, Boulevart St. Martin, Paris, for "*Improvements in water-closets, urinals, lavatories, and other receivers, and also in taps for supplying liquids to the same.*" June 5, 1866.

1607.—James Alexander Forrest, of Liverpool, in the co. of Lancaster, stained glass manufacturer, for "*Improvements in the construction of lanterns.*" June 13, 1866.

NOTICES TO PROCEED.

346.—Theophilus Alfred Gilbert Wellington, of Ross Hill, Handsworth, Staffordshire, for "*Improvements in apparatus for heating conservatories, apartments, or boilers by means of gas.*" Feb. 3, 1866.

372.—William Richards, of 7, Regina Road, Holloway, in the co. of Middlesex, engineer, for "*Improvements in means or apparatus for measuring liquids.*" Feb. 7, 1866.

412.—Charles Emile Giajola, of Birmingham, in the co. of Warwick, lamp-maker, for "*Improvements in privies and commodes.*" Feb. 9, 1866.

478.—James Young, of Limefield, in the co. of Mid Lothian, gentleman, for "*Improvements in distilling coal shales and other substances.*" Feb. 15, 1866.

506.—JOHN WOLSTENHOLME, of Radcliffe, in the co. of Lancaster, and JOHN TOMLINSON PENDLEBURY, of Elton in the same county, for "*Improvements in apparatus for shaving and cutting metal bars and metal tubing.*" Feb. 17, 1866.

729.—RICHARD LARKIN, of Elm Cottage, Old Brompton Road, in the co. of Middlesex, for "*Improvements in means or apparatus for obtaining light by the combustion of magnesium.*" March 9, 1866.

853.—WILLIAM CLARK, of 53, Chancery Lane, in the co. of Middlesex, engineer and patent agent, for "*Improvements in steam-pumps.*" A communication. March 22, 1866.

1337.—WILLIAM HACKETT and WILLIAM MARSDEN, both of Leek, in the co. of Stafford, plumbers, for "*Certain improvements in the construction of water-closets and in the valves connected therewith.*" May 10, 1866.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

1268.—JOHN CASSELL, "*Improvements in the treatment of mineral oils and hydrocarbons.*" May 21, 1863.

1287.—GEORGE STEVENS, "*Improvements in coke ovens, and in building and heating ovens or retorts for generating coal gas connected therewith.*" May 22, 1863.

1295.—WILLIAM CORMACK, "*Improvements in the distillation of coal tar, tar oil, resin, resin oils, all hydrocarbons, petroleum, or other mineral or vegetable oils and spirits derived therefrom.*" May 23, 1863.

1313.—HIPPOLYTE BENIGNE GIRARD, "*Improvements in the heating of every industrial and private apparatus by means of the oxygen and hydrogen gases combined and obtained from the decomposition of water.*" May 25, 1863.

1324.—MICHAEL HENRY, "*Improvements in apparatus for raising, forcing, and moving fluids.*" May 26, 1863.

1445.—WILLIAM WELLS and JOHN WILLIAM MYERS, "*Improvements in apparatus for obtaining artificial light from volatile liquids or fluids.*" June 10, 1863.

1477.—JOHN JONES, "*Improvements in gas-regulators.*" June 12, 1863.

1479.—THOMAS WRIGLEY, "*Improvements in machinery or apparatus for filtering or cleansing water or other fluids.*" June 13, 1863.

1501.—JAMES JOHN SHEDLOCK, "*Improvements in valves for the passage of steam, gas, and fluids.*" June 16, 1863.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £100 BEFORE THE EXPIRATION OF THE SEVENTH YEAR.

1400.—ALFRED VINCENT NEWTON, "*Improvements in gas-meters.*" June 8, 1859.

Parliamentary Intelligence.

HOUSE OF LORDS.

MONDAY, JUNE 11, 1866.

The following Bills received the Royal Assent:—The RYDE GAS; CONGLETON GAS AND IMPROVEMENT; SOUTH STAFFORDSHIRE WATER; BELFAST GAS; LONDON GAS; GRANGE AND CARTMEL DISTRICT GAS AND WATER; SLOUGH GAS; EAST BARNET GAS AND WATER; SOUTHGATE AND COLNEY HATCH GAS; EBBW VALE, BEAUFORT, &c., WATER; NELSON LOCAL BOARD; BIRMINGHAM WATER; CAMBRIDGE UNIVERSITY AND TOWN WATER; and the COLCHESTER GAS.

The GREENOCK AND SHAWS WATER, and the GREENOCK WATER Bills, were brought from the Commons, read a first time, and referred to the Examiners.

The CLEETHORPES GAS Bill was returned from the Commons, with the amendments agreed to.

The BARNSLEY LOCAL BOARD OF HEALTH Bill was returned from the Commons, with the amendment agreed to, with amendments; the said amendments were considered, and agreed to.

The CANTERBURY GAS AND WATER Bill was read the third time, and passed.

The CEFN ACREFAIR, AND RHOSYMEDRE WATER Bill was read the third time, with the amendments, and passed, and sent to the Commons.

The WIGTON WATER Bill was reported, with an amendment.

Petitions were deposited against the NEATH NEW GAS Bill, from the Neath Gaslight and Coke Company and others.

TUESDAY, JUNE 12.

The ROCHDALE WATER, and the SHEFFIELD UNITED GAS Bills, were reported, with amendments.

The DUNDEE WATER Bill was read a second time, and committed.

The ALDRINGTON, HOVE, AND BRIGHTON GAS Bill was read the third time, with the amendments, and passed, and sent to the Commons.

The GLASGOW CORPORATION WATER Bill was brought from the Commons, read a first time, and referred to the Examiners.

The STOCKTON GAS Bill was returned from the Commons, with the amendments agreed to.

THURSDAY, JUNE 14.

The BRYNMAWR GAS Bill was reported, with amendments.

The NEATH NEW GAS COMPANY Bill was read a second time, and committed.

The WIGTON WATER Bill was read the third time, with the amendment, and passed, and sent to the Commons.

The NEATH NEW GAS COMPANY Bill was referred to a Select Committee, consisting of the Earl of Devon (chairman), Duke of Grafton, Earl of Huntingdon, Earl of Wilton, and the Earl of Minto, who will meet on June 18, at eleven o'clock.

FRIDAY, JUNE 15.

The LONGTON GAS Bill was returned from the Commons, agreed to, with amendments.

The DUNDEE WATER Bill was reported, without amendment.

The BRITISH GAS COMPANY (STAFFORDSHIRE POTTERIES) Bill was read the third time, and passed.

The ROCHDALE WATER Bill was read the third time, with the amendments, and passed, and sent to the Commons.

The SHEFFIELD WATER, and the WANDSWORTH AND PUTNEY GAS Bills were reported, with amendments.

MONDAY, JUNE 18.

The GASLIGHT AND COKE AND CITY OF LONDON GASLIGHT AND COKE COMPANIES Bill was brought from the Commons, read a first time, and referred to the Examiners.

The LIVERPOOL CORPORATION WATER Bill was returned from the Commons, with the amendments agreed to.

LONGTON GAS Bill.—The Commons amendments were considered, and agreed to.

The KILMARNOCK WATER, and the BRIDGE OF ALLAN WATER Bills, were read a second time, and committed.

Petitions were deposited against the GREENOCK AND SHAWS WATER Bill, from inhabitants of Greenock; and from millowners, &c., on the Shaws Water Aqueduct;—and against the GREENOCK WATER Bill, from inhabitants of Greenock.

TUESDAY, JUNE 19.

The GASLIGHT AND COKE COMPANY Bill was brought from the Commons, read a first time, and referred to the Examiners.

The ALDRINGTON, HOVE, AND BRIGHTON GAS Bill was returned from the Commons, with the amendments agreed to.

The DUNDEE WATER Bill was read the third time, and passed.

The BRYNMAWR GAS Bill was read the third time, with the amendments, and passed, and sent to the Commons.

Petitions were deposited against the GLASGOW CORPORATION WATER Bill, from Messrs. Muir, Brown, and Co.;—and against alteration in the GLASGOW CORPORATION WATER Bill, from owners, &c., of factories on the Clyde.

THURSDAY, JUNE 21.

The WEARDALE AND SHILDON DISTRICT WATER; the GREENOCK AND SHAWS WATER; the GREENOCK WATER; and the GLASGOW CORPORATION WATER Bills, were read a second time, and committed.

The WIGTON WATER Bill was returned from the Commons, with the amendment agreed to.

The BRIGHTON AND HOVE GENERAL GAS, and the KILMARNOCK WATER Bills, were reported, with amendments.

FRIDAY, JUNE 22.

A petition was deposited against the GASLIGHT AND COKE COMPANY Bill, from the Hackney District Board of Works.

HOUSE OF COMMONS.

MONDAY, JUNE 11, 1866.

The STOCKTON GAS Bill was agreed to as amended by the Lords.

GLASGOW CORPORATION WATER Bill.—The Queen's consent signified, and the Bill read the third time, and passed.

The LONGTON GAS Bill, as amended, was considered. To be read the third time.

The ALDERSHOT GAS AND WATER Bill was recommitted to the former Committee.

Petitions were deposited against the erection of GAS-WORKS in the vicinity of Victoria Park, from the Committee of Management and Medical Officers of the City of London Hospital; from members of South Bromley Working Men's Club; from W. Holmes and others; from A. Rawles; and from Shoreditch Working Men's Club.

TUESDAY, JUNE 12.

The UNITED GENERAL GAS COMPANY (DUBLIN) Bill was reported, without amendment. To be read the third time.

The ALLIANCE AND DUBLIN CONSUMERS GAS Bill was reported, with amendments. To be read the third time.

GASLIGHT AND COKE COMPANY'S BILL.

Mr. ADAIR: On rising to move that the report of the committee on this bill be received, I must first of all, before addressing myself to the main question, observe that the opponents of the measure have taken a somewhat unusual course. I believe I am correct in saying that there is seldom an opposition to a bill on the consideration of the report unless for the purpose of referring it back to the original committee in case there be new evidence, and it is considered that there has been inadvertently some miscarriage in the consideration of the question. Now I suppose my honourable friend to my right (Mr. Tite) will hardly say that either of these cases has occurred in the consideration of this measure. I do not say that he is exceeding his powers in opposing the bill at this stage, but I only bring that circumstence under the notice of the House because I think it right that the House should be aware of it. And now I shall address myself more particularly to the object of the bill. It is a bill brought forward by the oldest gas company in the metropolis, which has at the present moment three large works in different parts of the metropolis—one in Horseferry Road, one in Curtain Road, and the third in Brick Lane. This company last year, conceiving that the state of public feeling on this subject would lead to measures which might have a tendency to lower the price of gas, and anxious to meet the public requirements as far as they could, began to inquire if any place could be found in the neighbourhood of London where they could carry on their manufacture in a more advantageous way, and by that means diminish the price of the gas, and at the same time remove their works from the densely crowded neighbourhoods in which they are at present situate. After considerable expense and great care they ascertained that such a site could be procured in Hackney Marshes; and, having ascertained this, they made a proposition to the City of London Gas Company, whose old and extensive works are situate near Blackfriars Bridge, that they should amalgamate with them, which, if agreed to, would immediately cause the removal of the works of the latter company from Blackfriars Bridge to the site where the new works would be carried on. Thus there would be the advantage of removing the present existing gas-works from the neighbourhood of the Thames Embankment, and from the neighbourhood likewise of St. Paul's. Well, one would imagine that if there had been any strong objection to this bill, there would have been a great many petitions against it from the parish of Hackney in which the proposed site is situate, and also from the adjoining parish to which a portion of the site extends. But I believe I am right in saying that there has been no great number of petitions from either of those parishes. But of this I am quite sure that neither of those parishes appeared before the committee as opponents to the bill, with the exception of the parish of Hackney, to arrange the manner in which the mains should be carried through their parish, and

not against the merits of the bill itself. These works being situate in the neighbourhood of Victoria Park, the attention, I suppose, of the parish of Bethnal Green was drawn towards the subject, and an agitation was commenced for the purpose of preventing the proposed works being placed in Hackney Marshes. And then there was also another opposition of certain persons who were interested in the neighbourhood, and who hoped that they would make good terms if they persevered in their opposition. There was also another opponent of a very formidable kind, an opponent whom we shall have here this afternoon, and will no doubt be very anxious to persuade the House to reject this bill. That opponent is the corporation of the City of London. The corporation will be represented on this occasion, I have no doubt, by my honourable friend on my right, and probably by the two honourable members for the boroughs of the Tower Hamlets and Finsbury, and they will adduce such reasons as they think right to endeavour to persuade the House to reject the bill on account of the proposed site of the works. This is a formidable opposition, as is shown by the fact that the Imperial Gas Company in deference to it withdrew their bill. Well, sir, the Standing Orders of both Houses of Parliament very properly require that whenever any gas-works are proposed to be erected within 300 yards of any public park, notice shall be given to the owners of houses and property in that particular neighbourhood. The Imperial Gas-Works, if I am rightly instructed, were within the 300 yards. Now that is not the case of the works proposed to be constructed under the bill now before the House. These works will be at least 633 yards from their nearest point to the nearest point of Victoria Park. I do not know that I can give honourable members an idea of the distance better than by saying that the present Horseferry Road works of the Gaslight and Coke Company are 465 yards from St. James's Park, and I need hardly say it must be in the observation of any honourable member that the trees in St. James's Park certainly do not suffer from an immediate and close proximity to the large works in Horseferry Road. But I would not have the House to consider that there is nothing but open green fields all round Victoria Park. Interposed between the proposed site of these works and the outer walk of the park are several manufactories of a very disagreeable description. There are patent manure manufactories and lucifer-match manufactories, and other noxious manufactories, and therefore, at all events, we do not come as the first disturbers of this purely agricultural neighbourhood. I am informed that my honourable friend on my right went down to view the spot, but that he merely got into a sort of wilderness the moment he got outside of Victoria Park, and he was at last persuaded that what was the proposed site of the Imperial Gas-Works was the site proposed to be appropriated by the bill now before the House. But perhaps I have been wrongly informed in that particular. There is another point on which very careful observation has been taken, and that is as to the direction of the wind so as to bring any disagreeable quantity of smoke from these proposed works to the injury of Victoria Park. It has been carefully and clearly ascertained that perhaps hardly for more than a quarter of the year—certainly not during the last year more than that period—has the wind blown from a quarter that could possibly bring the smoke so as to cause the slightest annoyance to those who frequent Victoria Park. And the House will recollect that when the wind does set in that direction it brings with it all the pestilential odours that arise from the other manufactories that are in immediate proximity to the park. This bill with many others was referred to a committee, which was not the usual committee consisting of four members, but a committee of twelve, and the bill was very carefully investigated, and great labour was bestowed on it, and great skill was brought to bear upon it at a considerable expense to the parties concerned. There was contradictory evidence, and what course did the committee take? They went down to inspect the spot themselves, and I hope I shall be confirmed by many members of the committee who were present that the view they one and all took was that there was no valid objection to the proposed site. But having viewed the proposed site, they required a clause to be inserted in the bill to the purport that the purifying process of these gas-works should not be carried on in any part of the works that were nearer than half a mile from the edge of Victoria Park. To give honourable members some idea of what that distance is, I may say that it is just about half a mile from where I am speaking to Charing Cross. That is about the distance at which the purifying process will be carried on. We may be told that it is perfectly possibly for us to find a site somewhere else which would be free from the objection that it would be a nuisance to those who frequent a public park or any ground for public recreation. That it is not possible for the company to do, because their ability to manufacture gas at a moderate price depends upon their ability to dispose of the residuum of the gas after the manufacture of the gas itself. Now the House may be surprised when I state that it will be six miles in a direct line from the place of manufacture at Hackney Marshes to the Marble Arch, which will be the western extremity of the district that this company has to serve. If the works are placed at a greater distance from that fixed point, they must manufacture the gas at a much higher illuminating power to sustain the service than is required by the Act of Parliament, because if you carry the gas to a greater distance than six miles it is necessary, in order to deliver it at the illuminating power required by the Act of Parliament, to manufacture it with an illuminating power of three or four candles greater than would otherwise probably be necessary to answer the requirements of the new public Gas Act, which we may expect will be passed in the course of next session. Now, sir, with the prospect of falling prices, with the almost certain conviction that Parliament will make a reduction in the price of gas, it will be impossible for this company to remove their works from their present site to a greater distance than the site which, after so much trouble and care, they have succeeded in finding. I assure my honourable friend, and those who act with him, that I have as great a desire to preserve public parks and places of recreation for the full enjoyment of all who frequent them as he has. But I have an equal anxiety, when I can do so without prejudice to any interest, to remove large existing gas-works from densely crowded and populous neighbourhoods. I believe that this is a case where gas-works may be judiciously and advantageously removed, and therefore I have come forward to move the consideration of this bill. There is one other point to which I should like, before I sit down, to draw the attention of the House, and it is this: The confidence of the public in committees of this House depends very much on their belief that all inquiries are conducted with care and diligence and great consideration before such a committee as has carried this measure. And, sir, I think if, where a committee has been unanimous in their report in favour of a bill, this House should get into the habit, on the motion of gentlemen however well intentioned, of reconsidering, and in some cases of actually neutralizing, the decision of those who have gone through the investigation and heard the evidence, that habit would tend to diminish the confidence which sustains at present the decisions of committees of this House. I hope that for these reasons the House will allow this bill to go forward.

Mr. TITE: My honourable friend set out with suggesting that there was some irregularity in the course that I am pursuing. My experience of the House is not equal to his, and I should be exceedingly sorry if he was right. All I want in the matter is to pursue a course which is perfectly fair, and I was advised that the proper course was to object to the bill on the report being brought up; and for this distinct reason—that I and those whom I represent do not object to this bill as a whole, but we simply object to the clauses taking the land. I have offered to my honourable friend privately—and I now repeat the offer publicly—that if he will strike out the clauses relating to the land at Hackney Wick, I will support the rest of the bill, which I must say has been drawn with great care. My honourable friend says that I represent here the corporation of London. I have nothing to do with the corporation of London; I am not a member of it, and I do not know what they have done with regard to this bill except as a member of this House, through the ordinary channels of communication. I am a member of the Metropolitan Board of Works, and they object to the situation of these proposed gas-works. And I may say for myself that I spent a whole summer afternoon in the immediate neighbourhood, and I came to the conclusion that the proposed site is an unfit place, having reference to the neighbourhood about it, and the park especially, for the establishment of this monstrous nuisance. For the House must understand that this is no ordinary affair, but that this is to be a great establishment. The works of these companies are to be concentrated in one establishment, and I venture to say, therefore, that these works will be a monstrous nuisance. Not less than 600—some say 1000, and some say 2000—tons of coal will be consumed there daily. I do not want the House to take my unsupported opinion with regard to Victoria Park. The Metropolitan Board of Works have spent a great deal of money in making a road to Victoria Park from Limehouse, in order to give accommodation to that dense population. I have the opinion of Dr. Hooper as to their injurious effect, and I will read the opinion of Dr. Miller, a skilful person on this subject. He says that the gas-works at Brentford, though situate on the other side of the Thames, are unmistakeably prejudicial to the Royal Gardens. I think that proves my case. If my honourable friend has taken the same pains that I have with regard to Victoria Park, he will know that the whole of the south line of road of Victoria Park has been planted with young trees, and there is not a tree that is not decaying at this moment, and the gardener told me that he cannot get a flower to grow on that side of the park. The fact is, that the vapours arising from gas are so subtle that in our own libraries we all know the effect of gas on the binding of our books. Sir, I say that we have no right to allow this company to occupy this place with their works, to the detriment of the poor, if another place can be found. The corporation of London, I was told to-day, have been occupied in finding a site which they can recommend to the House for their gas-works, and one which appears to me entirely unobjectionable. It is at North Woolwich, close to the railway, on the edge of the Thames, with every facility for landing the coals. One reason assigned for the support of this bill is that the site offers facilities for getting rid of the gas products—ammoniacal liquor, gas tar, and all the other charming products of gas. That is the whole case on the economical part of the question. Now, I venture to say that all the gas products ought to go by water, and do go by water, and all this company desire to do is to sell their coke to poor men with their carts and donkeys, and they think that that is to have an influence on this House. I think it an extreme case to interfere with the opinion of a body of a body of men, and particularly when it was presided over by my right honourable friend opposite—a man of sense and a man of business—but the circumstances of this case justify that interference. With regard to the money arrangements, they have done wisely, but they must allow me to exercise my own judgment as to whether it is right to erect great gas-works on that spot. Even the very provisions that they have put in the bill prove that they have the same feeling themselves. They say that certain parts of the works shall be half a mile distant; that the chimneys of the furnaces are to be a certain height; and if that is not satisfactory, certain parties are to determine whether they are high enough. Will my honourable friend allow me to call to his mind the great chimney at Warrington, which is 300 feet high, and yet the smoke from that chimney destroys the whole of the grass in that neighbourhood. I shall be told that that is sulphuric acid, but there is at all events a gas product which is detrimental to all vegetation. You will see this, also, in the valleys of Yorkshire. Alkali has, no doubt, something to do with it; but there is no alkali made in many of the valleys of Yorkshire where you see this thing, and through the whole of those valleys a most fatal effect is produced. I think it is not necessary for me to say another word. I ask that this company should not be afforded the opportunity of placing their gas-works in the situation I have described. I ask the House to listen to the prayers of thousands of poor people, whose petitions I have presented, to preserve this park, which is of such great importance to them, that they believe that it has raised the physical and moral character of the population. I ask the House whether, when we have expended £75,000 of public money on this park, and £25,000 more in making an approach to it, they will suffer this injury to be done when there is a remedy that can be applied without any difficulty. I beg to move—"That the further consideration of this report be postponed for three months."

Lord JOHN MANNERS: I rise to second the amendment, and I will take the opportunity of addressing to the House a few words on the subject. I do not remember when there has been so wide and deep-seated a feeling as that which has been excited by the proposal to erect gas-works in the immediate neighbourhood of Victoria Park. That feeling is so deep and so wide spread that I think this House will not do wrong in taking the matter into its own hands, notwithstanding the decision of the committee. This feeling is shared in not only by the poorest classes of the community, but by those who are higher in the social scale, by the professional classes, and by medical men. I have presented a petition to this House signed by 2000 clerks in warehouses in the City of London against the bill, and I must say I never knew so wide-spread a feeling as there is on this subject. My honourable friend who has moved that the report be received has told us that by the bill as it stands the objectionable portion of the gas-works will not be within half a mile of Victoria Park, and that the distance is equivalent to the distance from this House to Trafalgar Square. But I ask the House to act on that very test. I should be glad to know how the House would like a proposal to amalgamate three large gas-works in the metropolis and stick them down in Trafalgar Square. Should not we protest against subjecting ourselves to such a nuisance. The last company that was before us alleged that 400 yards was a safe distance, and the House unanimously rejected that proposal, although it was sanctioned by a committee. These great works, it is said, will be some 700 or 800 yards distant, and we are now told that though 400 yards was unsafe, the distance of 700 or 800 yards is perfectly safe. We have no scientific evidence in support of this statement. On the other hand, we have the evidence of Dr. Hooper and the evidence of scientific gentlemen who live in the neigh-

bourhood in contradiction of it. But without going into details on this question, I ask the House to act on the broad general principle of public policy, and say that they will not sanction this or any other scheme for bringing these vast works, with all their train of attendant nuisances, within anything like unreasonable propinquity of Victoria Park.

Sir JOHN TROLLOPE: Having had the honour of being appointed by this House to take charge of this bill, and having sat, with the other members of the committee, on the inquiry for a very lengthened period and gone very minutely into the evidence that was brought before us, I really think I am, perhaps, rather more qualified to give on opinion on this subject than my honourable friend the member for Bath, although he may be a member of the Metropolitan Board of Works. The Metropolitan Board of Works petitioned against the bill in question, and they were heard by eminent parliamentary counsel, who did not call even a single witness in corroboration of the statements they made before the committee. I think if this House is to pass over the report of a committee in this cursory manner, it will be taking a most unusual and most ungracious course. I think it most ungracious towards any committee that has devoted its time for five long weeks to treat its decision in the way that is proposed. It is a course that is totally wanting in courtesy to the committee. We took evidence very minutely on every point, not only as to the financial part of the question, on which the honourable member entirely approves of our decision, but on the question of site. The question which the honourable member brings before the House is really of very small compass. It is this—where are the gas-works to be put in this City? The committee felt it due to the public and to themselves not to be guided entirely by the evidence brought before it, but they went in a body to view the *locus in quo* that they might judge of its fitness for the purpose. We found that it is situated in the marshes below Hackney, and that there is not a single residence within half a mile of the spot. It is bounded on all sides by water; it is a marsh in summer, and a sea in winter. We were told that during the whole of the winter it is some feet under water. Therefore, it is obvious that no population could spring up there; no houses could be built there without raising an embankment and raising the ground. I believe the extreme distance of the spot where the purifying process will be carried on will be 1000 yards from the park. I am sorry to tell the honourable member who described the beauties of the park that I found all the trees that had been planted were in a decaying state. In all probability if the gas-works were there it would be said that that was the cause. The honourable member said already the works were highly injurious to the vegetation, and he led the House to imagine that they were gas-works that he was speaking of. Why these works are for making vitriol, which everybody who has the least chemical science knows is a totally different matter. Then the honourable member for Bath said that at Warrington there were works that destroyed the vegetation all around. But did he say that they were gas-works? We all know that the works in question are alkali-works. We had no evidence, nor was it attempted to be proved before the committee, that vegetation is in any way affected by gas-works. Many members of this House frequently pass along Birdcage Walk—and we have heard what is the distance from St. James's Park to the gas-works in Horseferry Road—and will any honourable member say that there is a single tree in St. James's Park that is injured by those works? Therefore I say it is somewhat hard that this committee should have its labour in vain. The committee has not —I am sure I have not—the slightest interest in the matter. The only object they had was for the public good, and it is quite obvious that the gas-works must be somewhere in the neighbourhood of London. You cannot drive them to make their gas at a distance; it must be made in the neighbourhood of London. One witness said there was a vast amount of waste coal about collieries that might be manufactured into gas. Probably he thought with the honourable member for Westminster, that we are coming to an end of our coal supply. But it is quite obvious that the gas required for the consumption of London must be manufactured in the neighbourhood of London. And can any one say where there is a place in the neighbourhood of London that is without population? One witness appeared before us and told us that these gas-works would not be in the slightest degree detrimental either to himself or his tenants, and he is a large proprietor of houses between the proposed works and Victoria Park. And he told us something more about those excited meetings in Victoria Park, concerning which I have no doubt we shall hear something from the honourable member for Stoke. He told us that he had attended some of those meetings, and that there were not 20 inhabitants of the neighbourhood there, but that the meetings were mainly made up of people who wandered about the park and people of that class. And he said that the speakers led the meetings to believe that the works were to be established within the park itself, and under that impression I have no doubt it was that many of the 2000 petitioners signed the petition. I was asked only yesterday if it was true that the committee had sanctioned the placing of these great gas-works in the centre of Victoria Park. I mention this to show how easily a notion of that kind can get abroad. I may state that the gas is to remain in close retorts, so as to give out no smoke or odour whatever, and the chimneys are to be constructed—this we put in a separate clause—under the inspection of the Metropolitan Board of Works, and not to be constructed otherwise than under their approbation. I confess I was loth to give them any power whatever, for I have found them too ready to interfere with a great deal more than concerns them, and therefore I was very anxious to exclude them; but in deference to their opinion and their counsel we put in a special clause to that effect. We did what we could in every possible way to protect the interests of the public. Let me allude to one other point that really would be of great interest to the public. These gas companies possess large works at the present time, in very crowded parts of this metropolis. One of them is in the parish of St. Luke's, in Brick Lane, and another in Shoreditch. Both of these works are to be removed, and the works in the Horseferry Road will be removed also when these great works come into full operation. And there are other works near Blackfriars Bridge, in the neighbourhood of St. Paul's and the Temple, which it is well known have been much objected to, which are to be removed also. Therefore I think I am entitled to say that public benefit will accrue from the passing of this bill. And the committee I have had the honour of acting with on the subject of the supply of gas to the metropolis have in their general report made some recommendations which, if acted upon by Her Majesty's Government in another session, will be of the greatest possible benefit to the metropolis. The honourable member has alluded to the site chosen by the corporation of the City of London for their works. Why, we had more objection to that site than we had to Victoria Park. It is close to Victoria Docks, and only some six miles down the river, and more dangerous to the neighbourhood. We had infinitely more petitions against it than we had against the site now under consideration. The only petitions that came before the committee against this site were one from the City of London, and the other from the Metropolitan Board of Works. They were fairly considered, and the committee came to a unanimous conclusion in favour of this bill, and I hope that the House will not stultify their own committee by reversing their decision.

Mr. BERESFORD HOPE: My right honourable friend is no doubt anxious that his handiwork, so far as the report goes, shall not be done away with, and he has made an appeal to the House to confirm the decision of the committee. One of the arguments that he adduced was, that a large proprietor of houses in the neighbourhood said there was no objection to the bill. I believe he is the gentleman who has circulated a long lithographed letter we have all got. I only hope that he is not the same gentleman who, when the former bill was before us, circulated a still longer lithographed letter on our side of the case. If my right honourable friend will tell me the name of the writer of his letter, I will him the name of mine. Then, again, he drew a picture of this desolate region. He said it was surrounded with water on every side. Now, I was on the ground the other day, and I stood on it with the solicitor and the engineer of this company. On the east side it is bounded by the river Lea, which divides it from a rich and fertile meadow; on the western side there is a ditch, about the width of one of the gangways of this House, and I believe there is a little stagnant water created by a railway embankment on the other side. As to its being at a distance from habitations, that is so on the London side, but London is every day growing up with rapid strides nearer and nearer to it. And let me call the attention of the House to the fact that this land is on the London side of the river Lea—on the west side—which may on the most moderate computation be considered as the natural boundary of the metropolis on that side. If with the great growth of London, and the necessity there is for sanitary arrangements, we are not to take at once a bold and broad line, and determine that works of this kind shall not be erected within the boundaries of London, these works will increase till London becomes a vast manufactory. These works are to cover 20 acres of ground. If we are not to take our stand, if we are not to say that they shall be carried beyond the boundaries of London, where are we to take our stand? I was rather interested in one argument of my right honourable friend. He said, if you put these works there you will get rid of the gas-works near the Temple to which everybody objects. But this morning I had a visit from the chairman of those gas-works, who attempted to persuade me that everybody was in love with them, and he read me a string of letters to that effect from people on the spot, who are, no doubt, under the influence of the gas companies. But let me entreat the House once and for all to dismiss those considerations; to deal with the matter boldly; to look to the future of London. We ought to pay some regard to the unanimous wish of the people of the neighbourhood. I have been among them; I have spoken to them and ascertained what are their views. It is a beautiful sight to see them crowd to the park which they consider a beautiful place, and to see how they cherish it. I hope that we shall show that we are friends to the poor; that we shall show to the poor inhabitants of Bethnal Green that the preservation of Victoria Park is as dear to us as the preservation of Hyde Park or Kensington Gardens; that we shall insist on this company spending a few more pounds to place their gas-works where the coke and the tar can be put on board the lighters in the river. This is the whole question, and I hope that the House will give a preponderating majority to the motion of my honourable friend the member for Bath.

Mr. AYRTON: The right honourable baronet who presided over this committee has made an appeal to the House to respect its decision, but if we were to yield to that appeal whenever it is made, we should practically deprive the House of all power to exercise its discretion in reviewing, when necessary, the conduct of any committee. Let me ask the House whether they have not some cause to pause before they adopt the report of the committee. The parishes in which these works are proposed to be erected appear to have placed themselves under the jurisdiction and in the hands of the Metropolitan Board of Works, and that board being charged by this House with the duty of watching over the interest of the inhabitants generally, came to the deliberate judgment that the erection of these works would be highly prejudicial to the neighbourhood, and they therefore undertook the duty of opposing the bill before the committee. Now I maintain that the right honourable baronet himself has stated enough to justify the House in pausing before it adopts this report, because he has entirely failed to remove the real objection to their proceedings. It is not a question of whether small gas-works shall be erected on the site in question, but whether you shall concentrate in that place a great number of gas-works—whether you shall, in fact, have an unlimited manufacture of gas in that place. You pass down a street and are not annoyed by the smoke of the chimneys of the houses, but if you could bring three or four millions of chimneys into one place, and set all the fires alight, you would create an almost intolerable nuisance. The question is, whether you will allow several gas companies to unite and put down their gas-works in one particular spot. It is quite clear that it is a question of degree, and as there is no limit to the extent of the works there is no limit to the nuisance. Of course, if you have works to supply only one district they will be small, but if you are to have gas-works there to supply nearly the whole of London they will be enormous. Then the question is whether you will select as the place for this aggregation of evils the spot which has been provided by Parliament for the recreation of the people. Why surely this is the very last spot that ought to be selected. Then what is the other argument? That there are already some manufactories of a noxious character there. But surely that is a reason why there should not be any more. If the neighbourhood has already suffered is that a reason why it is to be overwhelmed with nuisances of this kind? Therefore, I say that the real question that arises out of this bill, on the showing of the right honourable baronet himself, has not been thoroughly considered by the committee, and we are not, therefore, in a position to pass this measure and allow this company unlimited license to erect works. What would be the result of throwing out the bill? They have got their works, and they can come again next session, and if they can convince the House that further powers are necessary, they will no doubt have such powers as may be necessary for the manufacture of gas. But they ought not to be allowed to erect works which will overwhelm a particular district. I maintain that it is in the highest degree dangerous to aggregate works to an enormous extent in one particular place, because if there were to be an accident the consequence would be terrific; and if you have this enormous quantity of gas in one place, the inconvenience to the inhabitants might be no less great in having the supply suddenly withdrawn. I maintain therefore that it is necessary for the protection of the inhabitants that the gas-works should be diffused, and that there should be a sufficient number of them, so that if there should be an explosion the in-

convenience would be small. I hope the House will agree to the motion of the honourable member for Bath.

Mr. COWPER: As I have been alluded to, and as Victoria Park is public property, I must say, from my acquaintance with that matter, that the carrying out of the decision of the committee, which would allow enormous and centralized works to be erected in that neighbourhood, would be highly objectionable. I feel that any one who really feels an interest in Victoria Park ought on that account to oppose this bill. Already the vegetation in that park is extremely injured by the many noxious manufactures that are carried on in that neighbourhood; and if in addition to those now existing these large works were allowed to be established, I believe that the people who go there for health and recreation and for fresh air would find that they were breathing ammoniacal gas, and they would at all events not find that healthy enjoyment that they have now. I know that it is very difficult to state exactly the distance that these vapours may travel. It may be 600 or 1000 yards, but the committee do not appear to have had the opportunity of going into that part of the subject, nor, as I am aware, did they have before them any scientific evidence regarding it. I feel that after all the pains that have been taken with Victoria Park, and after the large sums of money that have been spent upon it, we ought not to run the risk of practically destroying it. It is barely possible that the evil may not be sensibly felt, but it is possible, on the other hand, that it may be felt very seriously; and therefore I think it is right on public grounds, for the purpose of protecting this great resort, which is a source of immense enjoyment to the inhabitants of the east end of London—it is right that this House should not pass a bill which may so injure the frequenters of that park. The right honourable baronet, the chairman of the committee, rather defended the course which he had taken, with the idea either that the land would not be otherwise available, or that the gas companies could not find any other place where to erect their works. We have been told that these marshes can be rendered fit for those works, but that they cannot be rendered fit for ordinary habitations. But in reference to the place where these gas-works may be, why should they not go six or seven miles from London, on the banks of the Thames, a far better place. It is said that here they have the advantage of railway communication; but is not the advantage of river communication much greater and more economical, and also as affording a greater facility for getting rid of nuisances than placing them near this railway, within 630 yards of Victoria Park? I am quite sure that this House ought to take care, so far as lies in its power, to prevent the establishment of noxious manufactories in the vicinity of places of public resort.

Sir JOHN PAKINGTON: I have only one word to say. I have very little knowledge of the locality, and certainly have no local prejudice, but I do feel a deep interest in that admirable institution, the hospital for consumptive cases, which is situate very near to Victoria Park. I have received a very strong representation from persons who are deeply interested in that hospital, and within a few days I have presented a petition to this House from the authorities of that hospital, stating in the strongest terms that if those gas-works are established where it is the intention to place them they will produce the most injurious and unhappy effects on the unfortunate inmates of that hospital.

Mr. BUTLER: I desire to express a hope that Victoria Park may be preserved for the thousands of artisans who live within a short distance of its boundaries. I think if honourable members would occasionally visit Victoria Park as I have done, they would be better able to judge of the kind of injury which the establishment of large gas-works within the distance of a few hundred yards would inflict. It has been argued as a reason for allowing those gas-works to be erected that several offensive trades are carried on in that locality. But we desire to get rid of those offensive trades, and not to add to them, and the erection of these enormous gas-works within 500 or 600 yards of the park, would be of more consequence than the whole of the other works in the locality. I implore the House not to inflict this cruel injury on the neighbourhood. Under ordinary circumstances, I should certainly be disposed to support the decision of a committee; but this is an exceptional case. It is a case in which the happiness and enjoyment of tens of thousands of our fellow inhabitants are involved. There are frequently from 10,000 to 50,000 persons enjoying themselves in that park at a time, and if you pass this measure the park will be destroyed. (No, no.) At all events, that is a matter of opinion. I believe that the vegetation will be destroyed, and the park will then be deserted. The country has at great expense formed that park, and it is too much to suppose that this House will throw that expense to the winds.

Mr. PAULL: I very much regret, and think it most unfortunate, when members who have served on commitees are called upon to defend the decision they have come to, because they appear before the House in the character of advocates when they have been discharging a duty of a purely judicial character. But when we hear appeals such as those which have been made to the House, founded on sentiment and feeling, and when we hear a minister of the Crown lending his office to prevent what I deem to be a course of justice, I think it desirable, as a member of the committee, to state to the House the evidence upon which the decision of the committee rested, and which, if this House intends to uphold the dignity of those judicial tribunals it thinks fit to create, ought to be the evidence which should guide it to its decision. Now, as regards the site, some gentlemen seemed to think it an exceedingly easy thing to find a site within an easy distance of London. Now, the evidence of the engineer of this company was that for a long time they have been seeking a site in the neighbourhood of London on which gas-works could be erected, and that on both sides of the river, and that they have found no place so eligible as this. And why do they think it is the most eligible? In the first place, it is more removed, I believe, from habitations than almost any other part of the suburbs of London, and it is almost certain to remain so, because, as has been stated by my right honourable friend who visited the site—and I may say that I also visited it—it is a marsh in summer and a sea in winter. On one side it is bounded by the river Lea, on another by a narrow ditch, on another by the marsh, on which it is said no habitation could be built. And I may say that there is a railway with which they can have a communication made. It is eligible because they have water communication on the one side and railway communication on the other; consequently they will be able to get their coals at a cheaper rate. This is a matter which has been investigated by the committee during 16 sittings, and it is of the highest importance as regards the supply of gas to the City of London that this bill should be passed. The parties have been placed in a peculiar position, because they have had their bill referred to a committee of twelve, and they have had to stand the expense of an inquiry into the working of a public Act of Parliament and to appear there day after day while that inquiry was going on, whereas if this bill had been referred to an ordinary committee, it would probably have gone before the chairman of the Committee of Ways and Means, and have been disposed of in a short time, for it was practically unopposed. If there was so much objection to this site as has been stated by the honourable member for Bath, why did he not appear and state that before the committee. I have reason to believe that the honourable gentleman was invited to appear before the committee, but he did not. One gentleman was called by the counsel for the Metropolitan Board of Works, who was a clergyman, but where were the authorities of the parishes in which this land is situate? They did not appear to oppose this bill, and this gentleman who did appear described himself as "the populous clergyman, and the agitator of the neighbourhood." That is out of his own mouth. The honourable member for Bath and the honourable member for the Tower Hamlets speak of the establishment of these works as a grievance, but this was the single witness that was called, and he spoke of the injury to the park. And what did he say? Why, that it was not so much a nuisance arising from the works or any noxious product of gas, but it was simply smoke. Why, no doubt smoke is injurious; we all know that. But there is smoke now all around the trees in St. James's Park, and do they suffer? We have heard that the nearest corner of these gas-works is 630 yards from Victoria Park, and that the purifying process, which is the only part from which noxious vapours arise, will be at a distance of no less than 1000 yards; and therefore I say that the nuisance from these gas-works resolves itself into a smoke nuisance. Well, does the House think that because one more chimney will be raised, and a certain amount of smoke will pass over the park, that this accommodation should not be given? Let me remind the House what it is that it is asked to do. You are asked to give power for the erection of gas-works, in consequence of the erection of which two very large gas-works in London will be removed for certain, and by the amalgamation which is contemplated a third. I think that the balance of advantage and disadvantage to the public is fairly on the side of the erection of these works, and therefore I ask the House to support the decision of the committee. Before the House comes to a hasty decision, I think it ought to have before it the evidence on which the decision of the committee was given.

Sir ROBERT PEEL: I have no interest in this company, nor have I any interest in the Metropolitan Board of Works, but I do take an interest in the decisions of a committee of this House, and I think we ought to adhere to the resolution of the committee on this subject. I must say that if the popular clergyman referred to by the honourable member for St. Ives (Mr. Paull)—or as he called him in the heat of the debate, "the populous clergyman"—had happened to be under the gallery to-night when his name was dragged before the House in the way it has been, he would have been justified in saying "Paull, Paull, why persecutest thou me?" I wish briefly to refer to one observation that fell from the honourable member for the Tower Hamlets. He said the bill would do a great deal of damage to the district he is interested in. If that is really the case there is not a man in this House who would not be prepared to consider what that damage might be. The honourable member for Stoke (Mr. B. Hope), spoke in what I may term broad and bold oratory on this subject. He said that the district of Spitalfields was as dear to him as was his own drawing-room. But I would ask him to support the motion brought in by my honourable friend, and to remove the nuisance which lies at his own door rather than to interfere with this. I have long had my eye on the honourable member for Bath. I do protest against the honourable member standing up as he always does in this House on matters of taste. For the last five years I have had to submit to the overbearing conduct of the Metropolitan Board of Works, and when I see the honourable member rising in his place, not as representative of the corporation of London, but as representative of the Metropolitan Board of Works, I say he really should take more pains to consider upon what ground the committee have decided, and when they say this is a fit and proper locality in which to place these works, he should not come forward as representing the important and mighty Metropolitan Board, and say that in his opinion it is not a fit and proper place. The honourable member, as the representative of the Metropolitan Board of Works, has already interfered a good deal with the sites of other people. The Metropolitan Board of Works have destroyed many time-honoured sites. When he talks of the privileges of the poor being interfered with, I am sure that every one of us is anxious to see that the interests of the poor are properly maintained. I am one of those who in my own person have suffered considerably from the arbitrary conduct of the Metropolitan Board of Works, and I will tell the honourable member that I will have a very careful eye on his proceedings when he brings his intellect to bear on subjects of taste. I do not know what may be the opinion of the House, but I really do think that when a committee has, almost the whole of them, visited the site in question, and determined that it is a good and proper site, we ought not to follow the advice of the honourable member for Bath, but rather we ought to follow our own better judgment in a matter of this kind. It has been proved that six miles is the extent to which the illuminating power can be carried, and it is idle to say that the gas-works on that situation would do any injury to the park. There are gas-works near to Battersea Park, but they do not do any injury that I am aware of. There is a gentleman near me who says that he has gas-works in his own park, and although they are ornamental they emit the same vapour, nevertheless they in no way deteriorate the gentle beauty of the surrounding foliage. The city of Bath is a beautiful city, and yet nobody will say that it has been injured by its gas-works. I saw the honourable member (Mr. Tite) there often, when he did not think I was looking at him, and I now ask him whether he will assert that that beautiful city has been destroyed by its gas-works? Such being the facts, I trust that the House will adopt the decision of the committee, and not allow themselves to be led away by the arbitrary proceedings of the Metropolitan Board of Works under the guidance of the honourable member for Bath.

Alderman LUSK: I shall not detain the House three minutes. The honourable member who represents the Board of Works has misstated some of the facts. It is true we sat 15 days, but not on this bill. We had to consider the Act of 1860, and it was proved to be a bad one in its operation, and that the result was bad gas—less illuminating power and more impure gas. In consequence of all these things we recommended that the Government should bring in an Act themselves. I oppose the bill on that ground, and also because I think Victoria Park is as dear to the people of the east end of London as Hyde Park is to the people of the west.

Mr. HENLEY: I think it is not right to vote against the report of a committee without stating the reasons by which I am influenced. If I attended to what has been said here to-day, I should believe that gas-works are not a nuisance. But I am not of that opinion, and I shall now state the reasons on which I shall give my vote. I do not believe that the Chancellor of the Exchequer, fond as he is of grouping, would like to bring a group of gas-works within 600 yards of Hyde Park. Now this is a vast group of gas-works which is to be brought close to Victoria Park, for which we paid £100,000. If it be not fair to bring such a group within 600 yards

of Hyde Park, I am of opinion that it would be equally unfair to bring them within 600 yards of Victoria Park. I shall, therefore, vote against the bill.

Alderman LAWRENCE: I wish to say one word. I hope that this House will not decide this question in courtesy to the committee, but on the merits of the question itself, and I trust that the inhabitants of the east part of London will have their park preserved, as well as the other parks of the metropolis. The proposition is to place the gas-works as near to Victoria Park as Primrose Hill is to Regent's Park, or as the Exhibition building of 1862 is to Hyde Park. It has been asked, what nuisance are the gas-works in Horseferry Road, or those near the Temple. But it is proposed to take them away. In fact, the whole of the gas-works of this district are to be removed to the vicinity of Victoria Park. It is also said that six miles is the limit to which gas can be sent. But is it fair to the inhabitants of the east part of London that the gas-works should be concentrated near to Victoria Park. The right honourable gentleman (Sir J. Trollope) says there are so many stinks in that neighbourhood already, that one stink more is a matter of no consequence; but I hope that the House will not consider that a reason for poisoning still further the atmosphere of Victoria Park.

Mr. MILLER: I differ from the honourable member for Bath. I have carefully examined the spot at which it is proposed to place these works, and I have come to the conclusion that a better spot could not be found in the neighbourhood of London. That spot is at present occupied by many noxious manufactures, and I am convinced that if the gas-works are not erected there, other manufactories ten times more noxious to Victoria Park and the neighbourhood will be erected. I find that during the winter there is water to the depth of not less then three or four feet on the surface of the ground fixed upon for these works, so that it would be impossible to erect new habitations there.

Mr. LOCKE KING: The question is, are we to take the opinion of a number of prejudiced members of this House or the opinion of the committee, which has adopted what I must call an extraordinary course by actually visiting the ground themselves. I think we are bound to take the opinion of the committee, who have taken such pains to come to an accurate judgment.

Mr. STANILAND: How does the question stand? The honourable member for Bath opposes the bill on behalf of the Board of Works, but his colleague at the Board of Works, the member for one of the Essex boroughs, says that the site is particularly well adapted. There has been no evidence given against the bill, except that which was adduced by the right honourable member for Droitwich (Sir J. Pakington), and I think that evidence of little weight in this matter. If he thought the gas-works would be prejudicial, it was his duty to go before the committee and state his opinion, but he absented himself from the committee, and now that he sees how the land lies he jumps up and opposes the bill.

The House divided on the question that the word "now" stand part of the question.

Ayes	169
Noes	138
Majority	31

The bill was then considered, and ordered to be read a third time.

THE DIVISION.

Order for Consideration, as amended, read; Motion made, and Question proposed, "That the Bill be now taken into Consideration:"—Amendment proposed, to leave out the word "now," and at the end of the Question to add the words "upon this day three months:"—(Mr. Tite:)—Question put, "That the word 'now' stand part of the Question:"—The House divided; Ayes 169, Noes 138.

MAJORITY—AYES, 169.

Acland, T. D.	Goldsmid, J. (Honiton)	Ogilvy, Sir J.
Adderley, Rt. Hon. C. B.	Gower, Hn. F. L. (Bodm.)	O'Loghlen, Sir C. M.
Annesley, Hon. Col. H.	Gray, Lieut.-Col. (Bolton)	Padmore, R.
Barnett, H.	Grove, T. F.	Parker, Major W.
Barron, Sir H. W.	Guinness, B. L.	Patten, Col. W.
Barrow, W. H.	Hamilton, Visct. (Donegal)	Patton, G.
Bazley, T.	Hankey, T.	Paull, H.
Beach, Sir M. H. (Glou. E.)	Hardy, J. (Dartmouth)	Pease, J. W.
Bentinck, G. C.	Hartington, Marquis of	Peel, Rt. Hn. Sir R. (Tam.)
Benyon, R.	Hartley, J.	Pennant, Hon. Col.
Bingham, Lord	Hay, Lord W. M. (Taunt.)	Philips, R. N. (Bury, Lanc.)
Booth, Sir R. G.	Hay, Sir J. C. D. (Stamford)	Portman, Hon. W. H. B.
Bridges, Sir B. W.	Headlam, Rt. Hon. T. E.	Potter, E. (Carlisle)
Bruce, Major C. (Elgin)	Heathcote, Sir W. (Oxford University)	Price, W. P. (Gloucester)
Bruce, Sir H. H. (Coleraine)	Henderson, J.	Rawlinson, Sir H.
Burghley, Lord	Hibbert, J. T.	Read, C. S.
Cairns, Sir H. M'C.	Hogg, Lieut.-Col. J. M.	Ridley, Sir M. W.
Calcraft, J. H. M.	Holland, E.	Robertson, D. (Berwicksh.)
Candlish, J.	Hood, Sir A. A.	Robertson, P. F. (Hastings)
Cartwright, Col.	Hornby, W. H.	Russell, H. (Beds)
Cavendish, Lord E. (Sussex, E.)	Horsfall, T. B.	Russell, F. W. (Limerick)
Cavendish, Lord F. C. (Yorkshire, W. R.)	Howard, Hon. C. W. G. (Cumberland)	Samuda, J. D'A.
Cavendish, Lord G. (Derbyshire, N.)	Howes, E.	Samuelson, B.
Clinton, Ld. E. P. (Notts. N.)	Huddleston, J. W.	Schreiber, C.
Cole, Hon. H. (Fermanagh)	Hughes, W. B. (Carnarvon)	Seely, C.
Cole, H. J. L. (Enniskillen)	Jackson, W.	Selwyn, C. J. (Camb. Univ.)
Coleridge, J. D.	Johnstone, Sir J.	Sheridan, R. B. (Dorch.)
Corbally, M. E.	Jolliffe, Rt. Hn. Sir W. G. H.	Simonds, W. B.
Corry, Rt. Hon. H. L.	Kekewich, S. T.	Smith, J. B. (Stockport)
Cowen, J.	Kendall, N.	Smollett, P. B.
Cooper, E. H. (Sligo Co.)	King, Hn. P. J. L. (Surr. E.)	Speirs, A. A.
Cox, W. T.	Kinglake, J. A. (Rochester)	Stacpoole, W.
Craufurd, E. H. J. (Ayr)	Kinnaird, Hon. A. F.	Staniland, M.
Crossley, Sir F.	Lascelles, Hon. E. W.	Stanley, Lord (King's Lynn)
Davie, Sir H. R. F. (Hadd.)	Leatham, W. H.	Stuart, Lt.-Col. W. (Bedford)
Dawson, R. P. (Lond. Co.)	Lefroy, A.	Stucley, Sir G. S.
Dawson, Hn. Capt. (Monaghan	Lindsay, Hn. Col. C. (Abin.)	Sturt, H. G. (Dorset)
Denman, Hon. G.	Lopes, Sir M.	Sturt, Lt.-Col. N. (Dorch.)
Dickson, Major A. G.	Lowe, Rt. Hon. R.	Sykes, C. (Beverley)
Dodson, J. G.	Lowther J. (York)	Taylor, Col. (Dublin Co.)
Duff, M. E. G. (Elgin)	MacEvoy, E.	Turner, C.
Dutton, Hon. R. H.	Mackinnon, W. A. (Lyming.)	Vandeleur, Col.
Dyke, W. H.	M'Laren, D.	Verner, Sir W. (Armagh Co.)
Dyott, Col. R.	Mainwaring, T.	Vivian, H. H. (Glamor.)
Egerton, E. C. (Maccles.)	Marjoribanks, D. C.	Walpole, Rt. Hn. S. H.
Ewart, W.	Marshall, W.	Walrond, J. W.
Eykyn, Roger	Matheson, A. (Inverness)	Walsh, A. (Leominster)
Fellowes, E.	Meller, Captain	Watkin, E. W.
Fildes, J.	Miller, S. B. (Armagh)	Whitmore, H.
Forde, Col.	Miller, T. J. (Colchester)	Williams, F. M. (Truro)
Forester, Rt. Hon. Gen.	Monk, C. J.	Williamson, Sir H.
Foster, W. O. (Staff. S.)	Montgomery, Sir G.	Wise, H. C.
Gallwey, Sir W. P.	Morrison, W.	Wyndham, Hn. H. (Suss. W.)
Gaskell, J. M.	Mowbray, Rt. Hon. J. R.	Wyvill, M.
Glyn, G. C. (Kendall)	Naas, Lord	Young, R. (Cambridgsh.)
Goldney, G.	Nicol, J. D.	
	Northcote, Sir S. H.	TELLERS.
	Norwood, C. M.	Trollope, Sir J.
		Adair, H. E.

MINORITY—NOES, 138.

Adam, W. P.	Feilden, J.	Martin, P. W. (Rochester)
Agar-Ellis, Hon. L. G. F.	Fitzgerald, Lord O. A.	Mill, J. S.
Akroyd, E.	Foley, H. W.	Mills, J. R.
Anson, Hon. Major	Forster, W. E. (Bradford)	Mitchell, A. (Ber.-on-Twd.
Armstrong, R.	Fort, R. [Louth	Moffatt, G.
Ayrton, A. S.	Fortescue, Rt. Hon. C. P.	Morgan, Hn. Maj. (Brecon.
Bagnall, C.	Fortescue, Hon. D. F. (Andover)	Morris, M. (Galway)
Baillie, H. J. (Inverness-sh.)	Gavin, Major	O'Beirne, J. L.
Barclay, A. C.	Gibson, Rt. Hon. T. M.	Oliphant, L.
Baring, H. B. (Marlboro')	Goddard, A. L.	Onslow, G.
Barnes, T.	Gore, J. R. O. (Salop, N.)	Otway, A. J.
Bass, M. T. (Derby)	Gorst, J. E.	Pakington, Rt. Hon. Sir J
Bateson, Sir T.	Göschen, Rt. Hon. G. J.	Percy, Major-Gen. Lord H.
Beresford, Capt. D. W. Packe-	Gregory, W. H.	Phillips, G. L. (Pembroke)
Blennerhassett, Sir R.	Gridley, Capt. H. G.	Pollard-Urquhart, W.
Bowyer, Sir G.	Grosvenor, Earl (Chester)	Potter, T. B. (Rochdale)
Brady, Dr.	Grosvenor, Lord R. (Flint.)	Powell, F. S.
Brand, Hon. H.	Gurney, R. (Southampton)	Rebow, J. G.
Brown, J. (Malton)	Gurney, S. (Penryn)	Repton, G. W. J.
Browne, Lord J. T. (Mayo)	Hamilton, Lord C. (Tyrone)	Sandford, G. M. W.
Burrell, Sir P.	Hamilton, Lord C. J. (Londonderry)	Saunderson, E.
Butler, C. S. (Tower Ham.)	Hanbury, R. C.	Seymour, H. D. (Poole)
Capper, C.	Hardcastle, J. A.	Simeon, Sir J.
Childers, H. C. E.	Hayter, Capt. A. D.	Stirling-Maxwell, Sir W.
Cholmeley, Sir M. J.	Heathcote, Hon. G. H. (Rutlandshire)	Surtees, F. (Durham, S.)
Cochrane, A. D. R. W. B.	Henley, Rt. Hon. J. W. (Oxfordshire)	Surtees, H. E. (Hertfords.)
Cogan, W. H. F.	Holden, I.	Sykes, Col. W. H. (Aberdn.)
Colvile, C. R.	Hughes, T. (Lambeth)	Taylor, P. A. (Leicester)
Cowper, Rt. Hon. Wm. F. (Hertford)	King, J. G. (King's Co.)	Torrens, W. T. M'C. (Finsb.)
Crawford, R. W. (London)	Kingscote, Col.	Treeby, J. W.
Cubitt, G.	Knox, Hn. Maj. S. (Dungan)	Tyrone, Earl of
Devereux, R. J.	Layard, A. H. (Southwark)	Vernon, H. F.
Disraeli, Rt. Hon. B.	Lawrence, W.	Vivian, Capt. H. J. C. W. (Truro)
Doulton, F.	Leeman, G.	Walcott, Adm.
Du Cane, C.	Lennox, Lord G. G. (Lym.)	Waldegrave-Leslie, Hn. G.
Duncombe, Hon. W. E. (York, N. R.)	Lennox, Lord H. G. (Chich.	Walker, Maj. G. G.
Dunkellin, Lord	Liddell, Hon. H. G.	Waterhouse, S.
Earle, R. A.	Lloyd, Sir T. D.	Western, Sir T. B.
Eaton, H. W.	Locke, J.	White, J.
Edwards, C. (N. Windsor)	Lusk, Alderman A.	Whitworth, B.
Edwards, Col. (Beverley)	Mackie, J.	Wickham, H. W.
Egerton, Sir P. G. (Chesh. S.)	Mackinnon, Capt. L. B. (Rye)	Winnington, Sir T. E.
Elcho, Lord	M'Lagan, P.	Woods, H. (Wigan)
Enfield, Viscount	Maguire, J. F.	Wyndham, Hn. P. (Cum. W.)
Erskine, Vice-Adm. J. E.	Manners, Rt. Hon. Lord J. (Leicestershire N.)	Wynne, W. R. M. (Merion.)
Esmonde, J.		TELLERS.
Ewing, H. E. Crum-		Tite, W.
Fawcett, H.		Hope, A. J. B. B.

The GASLIGHT AND COKE AND CITY OF LONDON GASLIGHT AND COKE COMPANIES Bill, as amended, was considered. To be read the third time.

Petitions were presented against the erection of GAS-WORKS in the neighbourhood of Victoria Park, from inhabitants of east and north-east of London; from east and north of London; from Haggerston: from visitors and frequenters of Victoria Park and others; and from Mile End and other places.

COAL.—Motion made, and question proposed, by Mr. Hussey Vivian—"That an humble Address be presented to Her Majesty, praying that she will be graciously pleased to issue a Royal Commission to investigate the probable quantity of coal contained in the coalfields of the United Kingdom, and to report on the quantity of such coal which may be reasonably expected to be available for use:

"Whether it is probable that coal exists at workable depths under the permian, new red sandstone, and other superincumbent strata:

"To inquire as to the quantity of coal at present consumed in the various branches of manufacture, for steam navigation, and for domestic purposes, as well as the quantity exported, and how far and to what extent such consumption and export may be expected to increase:

"And whether there is reason to believe that coal is wasted, either by bad working or by carelessness or neglect of proper appliances for its economical consumption."

Amendment proposed, by Mr. M'Cullagh Torrens, to leave out from the word "That" to the end of the question, in order to add the words "a special report as to the extent, quality, and cost of working coal in the United Kingdom be directed to be made by the persons charged with the conduct of the Geological Survey, and that the same be laid before Parliament with the least possible delay," instead thereof. Question proposed, "That the words proposed to be left out stand part of the question." Amendment, by leave, withdrawn. Main question put, and agreed to.

Resolved,—"That an humble Address be presented to Her Majesty, praying that she will be graciously pleased to issue a Royal Commission to investigate the probable quantity of coal contained in the coalfields of the United Kingdom, and to report on the quantity of such coal which may be reasonably expected to be available for use:

"Whether it is probable that coal exists at workable depths under the permian, new red sandstone, and other superincumbent strata:

"To inquire as to the quantity of coal at present consumed in the various branches of manufacture, for steam navigation, and for domestic purposes, as well as the quantity exported, and how far and to what extent such consumption and export may be expected to increase:

"And whether there is reason to believe that coal is wasted either by bad working or by carelessness or neglect of proper appliances for its economical consumption."

WEDNESDAY, JUNE 13.

The IMPERIAL GAS (No. 3) Bill was read a second time, and committed.

Petitions were deposited against the erection of GAS-WORKS in the neighbourhood of Victoria Park, from members of Pembury Grove Singing Class;—and against the GASLIGHT AND COKE COMPANY Bill, from vestrymen of St. Mary, Whitechapel.

THURSDAY, JUNE 14.

The LONGTON GAS Bill was read the third time, and passed, with amendments.

IMPERIAL GAS-WORKS (FULHAM).—A petition was deposited from George Glenny, landscape gardener and horticulturist, of Fulham, praying that the company may be restrained from increasing their works.

Petitions were deposited against the erection of GAS-WORKS in the neighbourhood of Victoria Park, from Spitalfields; from east and north-east of London; and from east and north-east of London and others, frequenters of the park;—and against the IMPERIAL GAS (No. 3) Bill, from the Vestry of St. PANCRAS.

FRIDAY, JUNE 15.

The LIVERPOOL CORPORATION WATER Bill was agreed to as amended by the Lords.

The GASLIGHT AND COKE AND CITY OF LONDON GASLIGHT AND COKE COMPANIES Bill was read the third time, and passed.

Petitions were deposited against the erection of GAS-WORKS in the vicinity of Victoria Park, from the Principal, Council, &c., of Working Men's College, Great Ormond Street; from Hackney; and from C. A. Dawson and others.

MONDAY, JUNE 18.

The ALDRINGTON, HOVE, AND BRIGHTON GAS Bill, was agreed to as amended by the Lords.

GASLIGHT AND COKE COMPANY'S BILL.

Mr. J. STUART MILL: On Friday morning last, at the last possible moment, I received a most earnest entreaty from some gentlemen who had opposed this bill to take the steps necessary to keep the question open until this day, and having no time to consult with those who had taken a prominent part in opposing the bill, I thought it right to comply with that request. Having since consulted with my friends on the question, I find that it is considered not consistent with the usages of the House to seek a re-hearing of a question which was so amply and so fully discussed the other day. I have, therefore, only to apologize to any gentleman who may have been inconvenienced by being led to believe that the question would be brought on again. I will only add that I hold in my hand a paper which I have received, but being informal I cannot read it to the House, signed by 38 persons representing property to the value of £157,773, in which they protest against the evidence of a single witness, on whose testimony they say the committee decided against them.

The bill was then read a third time, and passed.

Petitions were deposited against the erection of GAS-WORKS in the vicinity of Victoria Park, from J. Swain and others; from C. A Dawson and others; from members of Arts Club; from Vestry of St. Leonard, Shoreditch; and from Bow;—and against the IMPERIAL GAS COMPANY (No. 3) Bill, from owners, &c., in Chelsea; and from owners, &c., in Fulham.

TUESDAY, JUNE 19.

The ALDERSHOT GAS AND WATER (recommitted) Bill, was reported, with amendment.

The WIGTON WATER Bill was agreed to, as amended by the Lords.

HOUSE OF LORDS.

(*Before Lord* CAMOYS, *Chairman; Lord* VAUX, *Lord* TALBOT DE MALAHIDE, *Lord* POWERSCOURT, *and the Marquis of* BRISTOL.)

ALDRINGTON, HOVE, AND BRIGHTON GAS BILL.

THURSDAY, JUNE 7.

Mr. O'MALLEY, Q.C., and Mr. WILKINSON, appeared for the promoters; Mr. BURKE, Q.C., Mr. ARCHIBALD, and Mr. RICHARDS, for the Brighton and Hove General Gas Company; and Sir MORDAUNT WELLS and Mr. POLLOCK for the Brighton Gaslight and Coke Company, petitioners against the bill.

Mr. O'MALLEY, having stated the object of the bill, said the committee of the House of Commons, before whom the inquiry into the merits of the case was continued during six days, came to a conclusion which he had hoped was a settlement between the parties of all questions in dispute—a settlement, too, in which the Hove Company acquiesced. The committee decided that the promoters should have their bill with a capital of £75,000, and with the site at Aldrington, and they gave to the other company leave to enlarge their works at New Shoreham, for the purpose of supplying Old Shoreham and Lancing, with authority also to raise further capital to the extent of £75,000. When the preamble of the Hove Company's bill had been proved, the new company retired from further opposition, resting satisfied that they had got their bill, but the corporation of Brighton continued their opposition for the purpose of inserting clauses, and, with two exceptions, they succeeded in altering the bill of the Hove Company to the model of the present bill. In fact, the committee took the Aldrington bill as it was introduced, as a model, and framed the Hove Company's bill upon that model, upon the opposition of the corporation. In the course of the inquiry the question came up as to how much their new capital should be. They struggled hard to obtain £150,000, and they at last succeeded in getting it fixed at £75,000. One of their arguments before the committee was that as competition had been established between the Aldrington Company and themselves, they required this capital to enable them to meet it. He (Mr. O'Malley) therefore contended that the petitioners obtained this £75,000 on the footing of their acquiescence in the settlement which the committee had made between the two companies.

Mr. BURKE said he did not wish to interrupt his learned friend, but it was absurd to suppose that the Hove Company would require more money to compete with the new company. It was all nonsense, and he had a complete answer to give to it.

Mr. O'MALLEY insisted that the Hove Company obtained their increased capital on the very footing that the committee were establishing this competition, and it was considered that they acquiesced in the arrangement by which a third company was introduced into Brighton. Accordingly neither the Aldrington Company, nor the corporation of Brighton, nor the inhabitants of that town, had offered any opposition to the passing of the Hove Company's bill through their lordships House.

The CHAIRMAN: That is the bill to which the opposition has been withdrawn.

Mr. O'MALLEY said the opposition was kept up until two clauses were inserted. Then it was withdrawn, and it was hoped the same course would be pursued in reference to the present bill. He submitted, therefore, to their lordships that this was a case in which the Hove Company had no right to appear. The only ground of complaint alleged in their petition was the ground of competition, and the possible interference with their mains. No doubt, as a question of clauses, they would be entitled to ask for proper protection of their mains, but on the question of preamble it was not the practice of their lordships House to admit competition as a ground of opposition unless under exceptional circumstances, which did not exist here. He would now read to their lordships the very words in which the decision of the committee of the House of Commons was given on the present bill.

The CHAIRMAN said he did not think this committee ought to receive that decision, because they did not know upon what evidence it was founded.

Mr. O'MALLEY said he only offered to read it for the purpose of showing the nature of the arrangement made. The petition of the other company, which he would call the Blackrock Company, alleged that this bill was introduced in breach of an agreement which had been entered into with the promoters. The fact stated by them was, as he (Mr. O'Malley) was instructed, utterly untrue; and he had the greater boldness in saying so, because the matter was fully inquired into in the other House, and was met by an explanation not contradicted by the other side. But, beyond this, he submitted that the Blackrock Company had no *locus standi* on the present occasion, inasmuch as the existing companies having divided the town of Brighton between themselves, the Blackrock Company had nothing to do with the district which the Aldrington proposed to light.

The CHAIRMAN said he thought the committee need not trouble Mr. Burke to reply to the statement of Mr. O'Malley, as they were of opinion the petitioners had a clear case of *locus standi*.

Mr. *D. Black*, the town-clerk of Brighton, was then called and examined by Mr. WILKINSON. He said that the attention of the Town Council had been directed to the question of the supply of gas by the existing companies, and that in 1864 a committee was formed to receive and consider communications in reference to the public lamps. In May of that year the committee came to the conclusion that the price charged was excessive. They obtained an interview with the managers of the two companies on the 24th of June, and subsequently presented a report to the council, stating that the result was the companies refused to reduce the price of the public lamps, but promised an immediate reduction to the private consumers to 4s. 9d., and a further reduction to 4s. 6d. in the following June. The offers of the companies were conveyed to the committee in the following letters addressed to the town-clerk:—

The Brighton Gaslight and Coke Company,
Blackrock, June 24, 1864.

Dear Sir,—In accordance with the request of the Gas Committee that I would put into writing what, by the authority of the directors, I had communicated at our interview this afternoon, I very respectfully submit the following:—viz., that no alteration can be made in the charge for street-lamps under the conditions of the existing contract; that the price of gas to all classes of consumers by meter, on and after this day will be reduced from five shillings to four shillings and ninepence (4s. 9d.) per 1000 cubic feet; and that it is the intention of the directors to make a further reduction on and after the 24th day of June, 1865, from four shillings and ninepence to four shillings and sixpence (4s. 6d.) per 1000 cubic feet.

(Signed) J. O. N. RUTTER,
General Superintendent.

Brighton and Hove Gas-Works, June 24, 1864.

Sir,—In further reference to the subject of my interviews with the Gas Committee, I now beg to state that, for reasons submitted to the committee, my directors are unable to make any reduction in the present contract price for the supply of gas to the public lamps. But, in order to meet the wishes of the committee as far as possible, my directors will reduce the price of gas to private consumers to 4s. 9d. per 1000 cubic feet from this day; and this price it is their intention to further reduce to 4s. 6d. this day twelve months.

(Signed) J. B. PADDON, General Superintendent,
Brighton and Hove General Gas Company.

Complaints were afterwards made with respect to the inefficiency of the supply to the public lamps, and the surveyor was instructed to write to the companies, calling their attention to the subject. It was also resolved that two lamps with meters should be erected by the council, and lighted and extinguished by their inspector, for the purpose of testing the consumption. On the 13th of November, 1865, at a meeting of the Gas Committee, a letter from Mr. Paddon, the manager of the Hove Company, was read, offering to supply the public lamps by meter, on condition that a meter, to be provided and paid for by the corporation, was affixed to each lamp, at the lowest price charged to private consumers. There was no immediate answer given to that letter. On the 23rd of December he addressed a letter to Mr. Rutter, complaining of the dirty state of the lamps, and on the 29th of that month an answer was received to this effect:—

I acknowledge the receipt of your letter of the 22nd inst., complaining of the state of the public lamps in the borough. I think there is some mistake about this, for I have always been anxious that the lamps supplied with gas from this company should be kept in good order. Making allowance for weather, and some exceptional cases in which the glasses are too fragile or too much smeared with paint to admit of their being kept in good condition, I shall be greatly obliged if you will designate any lamps which are not regularly and properly cleaned by the servants of the company.

(Signed) J. O. N. RUTTER.

Upon that a resolution was passed calling the attention both of Mr. Rutter and Mr. Paddon to several places in which the lamps were found to be dirty. All the proceedings of the gas committee had been approved by the council who had also resolved to petition in favour of the bill of the Aldrington Company.

In cross-examination by Mr. BURKE, *witness* said the Town Council took the opinion of Mr. Hawksley about the prosecution to this bill, who most forcibly advised them against supporting the introduction of a third company. At a meeting of the council on the 2nd of May last it was resolved that no further opposition should be offered to the Hove Company's bill. The promoters of that bill volunteered to introduce nearly all the provisions which the corporation thought necessary for their protection. The resolution they came to was as follows:—"Resolved that the council accepts the undertaking contained in Messrs. Attree, Clark, and Howlett's letter, and agrees on the faith of that undertaking to offer no further opposition to the bill of the Brighton and Hove General Gas Company." The letter of the company upon which that resolution was come to was the following, dated April 21:—

Dear Sir,—We beg to inform you that the company, at the Wharncliffe meeting held yesterday, adopted the bill as it passed through the committee of the House of Commons, with the various amendments for the reduction of price, audit of accounts, &c., and also with the two amendments since suggested by you on behalf of the corporation—the one to correct the mistake as to the period when the streets should be broken up, and the other as to the testing of the purity, &c. And we undertake that the company shall not promote or assent to any alteration of the bill, so as to affect the corporation, on the understanding and engagement on the part of the corporation that they will not further oppose the bill.

Witness said he was present at the meeting on the 2nd of May.

Mr. BURKE: Can you tell me if at that meeting of the council this occurred:—"Alderman Brigden opposed the proceedings. He did so in committee, but finding he was alone he did not press his opposition. He had a strong suspicion that, at the present time, there was something going on between the Hove Company and the Aldrington Company, in the shape of an amalgamation or incorporation of the two companies into one, or that the new company had been purchased.—The Mayor: It is always the case.—Mr. Brigden said he hoped that whatever was done would not be to the detriment of the consumers." Then he says at the latter part:—"There was a gentleman present, whose name figured as a promoter in the Aldrington Bill, and he hoped he would give them some information on the matter. Certainly, he thought an amalgamation ought not to have taken place without the council being first consulted.—Mr. Johnstone said he was the person Mr. Brigden alluded to, and he would briefly state what had been done. The Hove Company had adopted the whole of the clauses inserted in the Aldrington Bill in its going through the House of Commons,

namely, to supply the town with 15-candle gas at 3s. 6d. per 1000 feet. —Alderman Brigden: No, 3s. 9d.—Mr. Johnstone: If his statement were wrong he was deceived. The Hove Company had also consented to have a testing-house at the town-hall. Under these circumstances the Aldrington Company had contemplated withdrawing their bill from Parliament. He could assure them that the promoters, at least as far as we were concerned, had not received a halfpenny.—Alderman Alger: Then you are very liberal. —The Mayor: You are out of the secret then.—Mr. Johnstone: He had nothing to say as to the other promoters, but they assured him that they too had received nothing. If the Hove Company and the Blackrock Company both agree to the clauses of the Aldrington Bill, it would be better than having the streets pulled up." Did Mr. Johnstone state that?

Witness: I cannot say as to the words, but certainly to the effect he did. I do not know that he is a director of the Aldrington Company.

Mr. BURKE: Was not the next observation by Alderman Alger: "Do I understand that after all this contest, labour, and trouble we are not to have a third company?" And was not Mr. Johnstone's reply: "Yes, that is it"?

Mr. WILKINSON: Tell me is it not the fact that the utmost dissatisfaction was expressed not only by the corporation, but by the inhabitants of Brighton generally, at the contemplated withdrawal of that bill?

Mr. BURKE: Alderman Alger says: "Do I understand, then, that after all this contest, labour, and trouble we are not to have a third company?—Mr. Johnstone: Yes, that is it.—Alderman Alger: Is it actually settled that the bill is to be withdrawn?—Mr. Johnstone: We have sent up petitions in favour of its being withdrawn." And so the matter ended.

In re-examination by Mr. WILKINSON, *witness* said the majority of the council were opposed to the withdrawal of the bill. He hardly knew whether the inhabitants of Brighton generally were opposed to its withdrawal. The resolution of the corporation not to oppose the further progress of the Hove Bill was not at all inconsistent with their support of the Aldrington Bill. Why they did not oppose the Hove Bill was that they did not consider the two or three matters in which the company had not complied with the wishes of the corporation were of that magnitude to make it worth while to incur the expense of further opposition. Their resolution did not involve any condemnation of the present scheme. He did not think he was authorized to say that, in their opinion, the Aldrington Bill was a necessary supplement to the Hove Bill in its amended form; but that was his own opinion. He was not aware that it was the intention of the promoters of this bill to mitigate the evils of breaking up the roads by passing their mains through the back streets. The inconvenience of breaking up the streets was great, but, if the town were better supplied with gas as the result, he thought the inconvenience would not be dearly purchased. He believed the Hove Company, when before the committee of the House of Commons, volunteered a clause by which it was provided that a portion of their new shares should be sold by auction; but that clause would affect less than a quarter of their capital as contrasted with the half of the Aldrington Company's capital.

Alderman *Brigden* repeated the evidence given by him in the House of Commons with reference to the quality of the gas supplied by the existing companies, and the complaints made of the want of competition, &c.

In cross-examination by Mr. ARCHIBALD, he said the corporation had a testing-place, but he did not think it was imperative upon them to test the gas. He believed it had been done, but no complaints had been made to the companies as the result. Mr. Quartermain, the inspector, had reported to the corporation that the Blackrock Company's gas was of good quality, but he himself did not believe it, and thought Mr. Quartermain had made a mistake. Mr. Hawksley pointed out the inconvenience of introducing a third company into the town, but that advice was not asked from him. He (witness) did not know that the referees had reported favourably as to the quality of the gas at present supplied in the town.

In reply to Sir MORDAUNT WELLS, *witness* said he was aware that in 1864 Mr. Woollett and Mr. Rowe, two of the promoters of the present bill, introduced a scheme for the formation of a consumers company. He had heard that Mr. Hannington, one of the largest drapers in Brighton, was placed in communication with the gas company to negotiate for a proper settlement as to the price of gas, and also with the parties representing the new company.

The CHAIRMAN asked whether the learned counsel was about to contend that the parties to both bills were the same.

Sir MORDAUNT WELLS said he was in a position to show that two of the three promoters of the present bill brought forward a scheme in 1864, and that upon that occasion Mr. Moor, the late member for Brighton, and Mr. Hannington, one of the largest drapers in that town, placed themselves in communication with the Blackrock Company, and the result of the communication between those gentlemen and the company was that the latter consented to reduce the price of gas from 4s. 9d. and 4s. 6d. to 4s., which was then considered satisfactory, and that the company paid in hard cash the costs of the promoters of that bill, amounting to £266. Having made these concessions, it was somewhat hard upon the company to find two out of the three promoters of the present scheme were the parties negotiated and arranged with on that occasion.

The CHAIRMAN said he did not know that because the parties were satisfied with the concessions made in 1864 they were to be bound to the arrangement at the present time.

Mr. WILKINSON said this was an exploded gun, which was discharged without effect in the House of Commons.

Sir MORDAUNT WELLS denied it, and said the Blackrock Company, through a technical objection, were shut out, and their case was not heard in the House of Commons.

Witness, in further cross-examination, said he believed that the Blackrock Company paid a part of the expenses of the promoters of the 1864 bill; he had heard that they paid the whole. He knew that the Blackrock Company had kept faith with the public by reducing their price to 4s.

Re-examined by Mr. WILKINSON, he said he was solicited to be identified with the company formed in 1864, but holding the position of mayor at the time, he declined.

Mr. *Woollett*, an ironmonger, of Brighton, corroborated the evidence of the last witness as to the quality of the gas at present supplied to the town. In reply to Mr. Wilkinson, he said he was one of the promoters of the bill in 1864. By the attempt to establish the Consumers Company in that year he was, at the present time, considerably out of pocket. By the arrangements then come to the promoters did not pledge themselves either directly or indirectly not to become the promoters of another company. He was the only person connected with the present bill who was a director of the Consumers Company. The shares in the present scheme had been remarkably well taken up, and he did not anticipate the slightest difficulty in raising the necessary capital.

Cross-examined by Sir MORDAUNT WELLS, *witness* said Mr. Moor, M.P., and Lieut.-Colonel Moorsom, who were directors of the Consumers Company in 1864, had nothing to do with the present bill. In reply to the question—"Who paid the expenses of that bill?" which was put to him in the House of Commons, he said: "I do not know who paid the expenses; I did not." When he made that answer he spoke of the expenses in the gross. He was applied to by Mr. Moor to give in a list of bills due by the directors. He gave Mr. Moor a list of those that had come in up to that time, and he intimated that he would settle them. The amounts for which he was personally out of pocket were for bills which came in subsequently. The expenses were paid by Mr. Moor; he did not know that the Blackrock Company afterwards repaid Mr. Moor all the money expended by him.

The CHAIRMAN said he did not see what bearing this had on the question before the committee.

Sir MORDAUNT WELLS said his object was to show that the Blackrock Company kept faith with the promoters of that scheme by reducing the price of gas, and that they had good ground of complaint, inasmuch as the very parties who received their money in 1864 now came forward with a speculative bill, which no doubt they wanted to sell again.

The CHAIRMAN repeated he did not see what this had to do with the question now before the committee.

Sir MORDAUNT WELLS quite admitted that the real question was whether this bill should pass, but still their lordships House was always particular that parties, when they did come before it, came with clean hands.

In further cross-examination, *witness* said the second bill was promoted before the terms agreed upon with the Blackrock Company were carried out. His impression was, that since the reduction of price the illuminating power of the gas had been diminished.

In reply to Mr. RICHARDS, *witness* said he had increased his subscription for shares in the new company since the bill was in the House of Commons to 100, representing £1000. There were numbers more taken up, and the deposit paid upon them, but he did not know what amount. He did not know how far the deposits would go towards paying the expenses if this bill were unsuccessful, but the promoters and directors would have to pay the costs, whatever they were. He did not say to the contrary in the House of Commons.

Re-examined by Mr. WILKINSON, *witness* said there was not the slightest pretence for saying that they were not prepared to pay the expenses of promotion, and no question upon the subject was put to him in the House of Commons. Before that committee there was no shareholder or director of the old companies examined with reference to the bill of the consumers company of 1864. Mr. Moor, M.P., who was one of the directors, called upon him, in conjunction with the other promoters, to sign an agreement to repay him a sum of £261 3s. 2d., which he had advanced on their behalf. On the 6th of April in that year, he received a letter from Mr. Moor, giving him notice that he was required to repay one-half of the sum mentioned in the agreement. That letter was submitted to the committee, who unanimously resolved that in their opinion the preliminary expenses should not fall upon the few persons at present liable to pay the money, and that it was desirable to call a meeting of the inhabitants, who would doubtless contribute towards the expenses, as by means of the arrangement the price of gas had been considerably reduced.

The CHAIRMAN said he did not think this was a subject worth pursuing.

Witness, in further cross-examination, said on the 11th of December, 1865' he wrote to Mr. Paddon, asking him if the Hove Company would undertake to reduce the price of gas to 3s. 6d. That was before he (witness) was a party to this company. On the following day Mr. Paddon replied to him as follows:—

Dec. 12, 1865.

Dear sir,—I have received your letter of the 11th inst., and I presume I best understand you in regarding it as unofficial. Considering that the time agreed upon for the reduction of the price of gas to 4s. to private consumers has not yet been entered upon, and that the question of the supply of gas to the public lamps is under the consideration of the Town Council, it is evident the present time is not a proper one to discuss farther reduction of price. Indeed any such discussion would be simply useless; for as the company have made an application to Parliament for a new Act, the question you have raised will be settled by a parliamentary committee, without reference to anything you or I may think or say on the matter.

(Signed) J. B. PADDON.

He (witness) felt himself at liberty to join the Aldrington Company after the receipt of that letter. This company was originally started to supply a particular estate at Aldrington, but it was received with such favour by the inhabitants of Brighton generally that the promoters were induced to alter its character and make it a great company for the supply of Brighton as it now appeared before the committee. There was not the slightest pretence for saying that either directly or indirectly he had come under any pledge to the existing companies not to promote the present company.

Mr. *Daniel Friend* and Mr. *David Richards*, the latter a surgeon and a director of the Aldrington Company, gave evidence similar to that deposed to by them in the House of Commons as to the alleged impurity of the gas now supplied to the town, and the increase in the consumers rental accounts notwithstanding the reduction of price. Mr. Richards said he had no chemical knowledge in respect of gas; had never tested it, and should think that it was not because of the excess of carbon but because of the excess of sulphur in it that his ceilings became blackened. He knew Aldrington very well, but was not aware that there was not a house in the parish or any other building than a turnpike.

Mr. *Foster*, a chemist, of Brighton, was called to prove that in proportion to the diminished quantity of gas consumed by him his bills had been larger since the reduction of price.

Mr. *Verrall*, solicitor, of Brighton, and local agent for the promoters of the bill, produced the subscription contract which he said was signed by 38 shareholders representing £13,420. He had also signed applications for other shares, making the total number 65. Every shareholder but three were residents in Brighton. He had not the least doubt the promoters would be able to raise the capital required for the purposes of the bill. All the shareholders had paid a deposit of 5s. each upon their shares. He had taken means to ascertain the probable consumption of gas, and had obtained signatures to 483 consumers contracts representing a consumption of 26,294,000 cubic feet per annum. Some of them were very large consumers—the Bedford Hotel, for instance, having about 300 lights, representing an estimated annual consumption of 2,000,000 feet. Petitions had been presented in favour of the bill, numerously signed; the only petitions against it were from the gas companies.

In cross-examination by Mr. ARCHIBALD, *witness* said the company was not originated for the purpose of lighting the toll-house, the only existing building in Aldrington, but for the supply of houses expected to be erected there. The total amount of capital upon which the deposit of 5s. per share had been paid was £16,980. He did not know the actual amount paid; it was about £423. The three shareholders non-resident in Brighton repre-

sented £6000 of the capital. They were the persons interested in the sale of the land at Aldrington, upon which the proposed works were to be erected. They were not the actual owners of the land; they were *cestui qui* trusts. It would rest with the directors whether they would allot shares to these "foreigners" to Brighton. About 130 persons in Brighton, out of a population of 100,000, petitioned Parliament against the Hove Company's bill.

Re-examined by Mr. WILKINSON, *witness* said 1076 householders had signed the petition in favour of the Aldrington Company's bill.

FRIDAY, JUNE 8.

Mr. *Frederick Ellman*, examined by Mr. O'MALLEY, said that he was one of the trustees of the Aldrington estate, and executor of the last owner, Mr. Ingram. The estate was devised with power to lay it out for building purposes, and part of it had been laid out. It contained 620 acres, and they had been offered £180,000 for it. A builder was now in treaty with the trustees, the matter being in abeyance only on account of the state of the money market. The land adjoined the parish of Hove, which was now a large and populous district. A portion of the Aldrington estate had been set apart for gas-works, and there was a contract to sell it to the promoters of this company. He considered the site absolutely essential for the purpose of gas-works, with the view of developing the estate and for supplying gas to Brighton. Being low all nuisances would be avoided, and being near the harbour coal would be obtained cheaper, while all the nuisance of the traffic into Brighton would be avoided and the tolls and cartage saved. An enlargement of the Hove Company's site would increase the nuisance to that locality, and the other House had refused to grant that company the power to increase their works there. The present bill was proposed originally for the parish of Aldrington only, and the promoters were induced to extend it to Brighton, in consequence of the very great feeling in favour of the scheme in that town. He believed no other site would be satisfactory to the Brighton people. It was the site wanted by the Hove Company, but refused them by the Commons.

Cross-examined by Mr. ARCHIBALD, *witness* said the price to be charged the promoters for the site was at the rate of £1000 per acre, which was only one-seventh of the price obtained by the trustees for other portions of the estate. The land was on the beach between the sea and the ship-basin, and was covered with shingle.

Mr. ARCHIBALD inquired whether witness was aware that a portion of the site was claimed by the Shoreham Harbour Commissioners.

Mr. O'MALLEY objected to the question, it having been, he said, fully argued before the committee of the House of Commons and the referees, and it formed no portion of the allegation in the opposition of the existing companies to the bill.

Mr. ARCHIBALD contended that as it was given in evidence that this site was part of an estate that was proposed to be sold, he had a right to cross-examine upon the point.

The committee ruled that the witness might be cross-examined upon the point.

Cross-examination resumed: Since this bill was before the House of Commons, the Harbour Commissioners had raised a point as to what were the limits of their wharf. The ground had now been stumped out, and this site was altogether west of their claim. He did not know that they now claimed a part of that which was scheduled in this bill. He had no information from them that they had abandoned their claim. He was aware that Colonel Carr Lloyd had raised a question as to whether a portion of this very site, or the whole of it, was not within the boundary of his manor of Lancing. He believed Colonel Carr Lloyd did not insist upon his claim. The trustees were in possession and could show a title for 100 years back. The question of the boundary of the manor had been investigated by a person under the authority of the Woods and Forests, and Colonel Carr Lloyd gave evidence upon that inquiry. He petitioned against this bill when it was in the House of Commons, and before the opinion of the commissioner was disclosed; since then he had not petitioned.

The CHAIRMAN said the committee did not think it right to stop the cross-examination as to site, but for the purpose of the present inquiry they looked upon the possessor to be the owner.

Cross-examination continued: The extreme portion of Brighton which the Aldrington Company proposed to light was about seven miles from this site. The Hove Company's mains ran through Aldrington, and they stated that their works were competent to supply all the gas that would be required there, but he (witness) thought they would be only able to do it very inefficiently, even with their new capital. The Aldrington Company only asked for £75,000, and he thought they would be able to do all they proposed with that.

Re-examined by Mr. O'MALLEY: On the evidence given before the House of Commons, he thought the existing companies would not be able to supply Aldrington, considering the constant increase taking place in the consumption in Brighton.

Mr. *S. Ridley*, an alderman of Brighton, said the general feeling in that town was in favour of a new company, and great disappointment was expressed at the abandonment of the bill of 1864. He was a shareholder in this company, and had no doubt the whole of the capital necessary for these works would be raised. He concurred in the opinion of the Town Council, that the inconveniences arising from the introduction of a third system of mains would be more than compensated by the benefit which a third company would afford.

Cross-examined by Sir MORDAUNT WELLS: The Blackrock Company could largely increase their present works, as they have plenty of land for the purpose. He was not aware that they had a considerable portion of capital uncalled up.

By Mr. RICHARDS: He could not state what the advantage of having a third gas company in Brighton would be. He did not know any reason in favour of it. He was unacquainted with the contents of the Hove Company's bill, and did not know whether the consumers generally knew anything about it; probably they were as ignorant as he was. He knew that the Town Council were almost unanimous in favour of the new company.

Re-examined by Mr. O'MALLEY: He was not able to say whether the clauses of the Hove Bill were taken out of the Aldrington Bill. He did not think the Brighton people would be content without another company being established.

Mr. *G. W. Stevenson* and Mr. *G. Anderson* gave engineering evidence similar to that given by them in the House of Commons. The latter, in cross-examination, said the shorthand-writer's note of his evidence before the Wandsworth Committee was wrong, where it stated that in his examination on the Aldrington Bill he said that if he had been asked as to the advisability of introducing a third company, he would have replied it was not advisable. What he said was, "Probably I would not," or, "Possibly I would not."

Mr. POLLOCK: Now let me ask you this question—are you still of opinion, taking the opening of the streets and the general question of the town of Brighton into consideration, that it would be advisable to introduce a third company?

Witness: Having reference to the existing facts that it is proved the companies have charged a high price and have not satisfied the public, the public have combined and brought a bill here under those circumstances. The public must have what they want, and if the old companies will not give it other companies will. I am no advocate for competition in the abstract, but local circumstances and local behaviour sometimes require it. I am satisfied there has been a great necessity for competition in Brighton.

Cross-examined by Mr. ARCHIBALD, witness said he had not examined the works of the Hove Company, and knew nothing of them except from what he had heard in the committee. If the two existing companies would do their duty, he was against the introduction of a third company. He admitted that there were inconveniences in laying down a third set of mains, but the disadvantage to the public of the breaking up of the streets was not much.

Re-examined by Mr. WILKINSON: He thought there was every fair reason morally and physically why the Aldrington Company should have their bill. Physically there was plenty of room for them, and morally they had been the cause of reducing the gas-rental of Brighton some £20,000 a year.

This closed the case for the promoters of the bill.

Mr. BURKE then proceeded to address the committee in opposition for the Hove Company. He was glad to arrive at a point when they might ask for their lordships decision, and to expedite that he had come to the conclusion, with his friend Sir Mordaunt Wells, that there was ample evidence upon the notes as they stood upon which to found the case for the rejection of this bill without calling witnesses. Complaints could easily be raised against any company, and gas companies were more open to them than any others, and in a variety of ways; but in ninety-nine cases out of a hundred an investigation of the complaints would show some obstruction in the main, or an insufficient burner, or a deposit in the pipe of the person complaining. If one consumer's gas was bad his neighbours must be also, because when it left the works it was of the same quality for the supply of the whole town. The learned counsel argued that a well-regulated monopoly was better than competition, remarking that he knew of no case in which a competing gas company had been established that had not resulted in coalition. In reference to the question of capital, he pointed out to their lordships that the Hove Company had power to increase their capital by £100,000, while the Aldrington Company only sought power to raise £75,000, and were in possession of no works. On the new share capital of the former only 7 per cent. was to be paid, while 10 per cent. was to be paid on the capital of the Aldrington Company. The less capital, therefore, employed the greater the benefit to the public. The learned counsel concluded by informing their lordships that all the model clauses adopted in modern Acts were introduced into the bill of the Hove Company, which was unopposed, and must, therefore, pass. The passing of that bill must, he said, have its effect upon the Blackrock Company, who could not charge a higher price than the Hove Company, the mains running parallel with each other throughout the town. The public had, therefore, all the security and all the benefits which Parliament could confer upon them, and the establishment of a new competing company was altogether uncalled for.

Sir MORDAUNT WELLS also addressed the committee, confining his observations chiefly to the fact that the promoters of a former bill withdrew on being paid their costs, and on consideration that the price of gas was to be reduced to 4s., the lowest price charged to any town in the kingdom, and yet before that reduction could be made, another bill was promoted by some of the same gentlemen. He also commented upon the utter absence of positive evidence of deficiency in the illuminating power of the gas supplied by the Blackrock Company, none of the witnesses being able to speak of any test having been applied.

Their lordships deliberated for a few minutes, when,

The CHAIRMAN said the committee had unanimously decided that the preamble of this bill was proved. The clauses in which no alteration had been made since the bill was before the Commons were then gone through, and agreed to without opposition, and the chairman was directed to report the bill to the House.

HOUSE OF COMMONS.

(*Before Mr.* KNIGHT, *Chairman; Mr.* GORE LANGTON, *Mr.* MCEVOY, *and Capt.* KEARSLEY.)

BRYNMAWR GAS BILL.

WEDNESDAY, MAY 9.

Mr. G. SOMERSET appeared for the promoters; and Mr. HUTCHINSON, parliamentary agent, for the petitioner, Mr. E. G. Williams, the proprietor of the present works.

Mr. SOMERSET said he had the honour to appear in support of a bill for better lighting with gas the town of Brynmawr, and the district by which it was surrounded. That district comprised Llanelly, Llangattock, Llangynidr, &c., and at present contained about 25,000 inhabitants. The only petitioner against the bill was Mr. E. G. Williams, of Brynmawr, the proprietor of the present works; and in respect to the other parts of the district, there was no opposition whatever. The committee were well aware that in coal districts towns had of late sprung up very rapidly, and that which a few years ago was almost a desert was now a flourishing district with towns of importance upon it. The town of Brynmawr contained about 8000 inhabitants, and was a place which was increasing in every way. At present, only a portion of the town was supplied with gas, and consequently the inefficiency in the supply had caused much inconvenience to the inhabitants, and want of it had been felt for a very considerable time. The present works were instituted by a Mr. Williams, the sole petitioner, by arrangement with the Duke of Beaufort, the lord of the manor. The roads at that time were under the management of the surveyor of the highways, but in 1851 the Local Board of Health was instituted, and since that time they had been the constituted authorities of the place. Since 1848 the town had been supplied, or rather partially so, by Mr. Williams. A great number of the inhabitants, the most considerable portion, however, had no gas whatever. Every one of those persons was, of course, most anxious for a supply, and wished to see the establishment of a company having powers such as were sought for in the present bill. Having stated these few facts, he would call the attention of the committee to the questions between the petitioner and themselves, and to the state of things which had existed at Brynmawr during the last few years. In 1848, as he had said, the existing gas-works were erected, and gas supplied by Mr. Williams, but he had never had the means for supplying the town as it ought to be; indeed, he had never had the means legally of extending his mains since 1851, because at that period the authorities of the place, the Local Board of Health, would not permit him to do so. Independently of this restriction as to extending his mains, the gas was most de-

ficient in every way, and in price was most excessive. All sorts of complaints arose at different times, both as to the quality and price, till at length the state of things became such that some years ago the formation of a limited company became talked of, but the inhabitants were unwilling to injure the property of Mr. Williams if he would meet the complaints and rectify the quality of his gas and so on. Matters, however, still continued, till it became necessary to institute the company, and certain of the inhabitants then determined to go to Parliament in order to enable them to get what they required—good gas at a reasonable price. Now, Mr. Williams, in his petition against the bill, stated that Brynmawr was already well and sufficiently supplied with gas; that his gas-works were established in that town with the consent of the local authorities; that he had expended large sums of money from time to time in their improvement, and that he had done his best to supply the town with gas for the last eighteen years. This latter allegation was true, but the gas had been supplied under a monopoly, and it was in consequence of the extreme inadequacy of that supply that the promoters of the company were obliged to do as they had done. With regard to his works having been established with the consent of the local authorities, there was a curious fact which could not be at all consistent with the allegation of the petitioner. The local board, in fact, had objected to the streets being taken up, and they say that he had no right to do so. Mr. Williams had, on one occasion, been summoned before the magistrates for breaking up the pavements, and he then set up an authority under the Duke of Beaufort. [The agreement between his lordship and himself, as to his right to do so, was handed in.]

The CHAIRMAN inquired if Mr. Williams had a lease of the ground.

Mr. SOMERSET: He had a kind of guarantee, in the form of a letter from his grace's agent, to the effect that the agent would undertake, in the event of Mr. Williams supplying the town with gas, that no person should oppose him. Whatever might have passed between Mr. Williams and the Duke of Beaufort, it was clear that, if he had any remedy, he ought to seek it in a court of law. If his grace had guaranteed Mr. Williams, it was possible that he might obtain damages; but, at all events, Mr. Williams was clearly not entitled to break up the public streets of the town. Well, the question which he (Mr. Somerset) had to submit to the committee was this: whether the town of Brynmawr required to be better supplied with gas. There was no doubt that, as Mr. Williams had no power to extend his mains, he could not meet the requirements of the town, and, if so, then it became a question whether a company, having parliamentary powers, ought not to be established for the purpose of affording that supply which was considered to be absolutely necessary. The present works could not supply more than one-third of what was required, and this was an important element to be considered. Mr. Williams had said that the price of his gas was not excessive. Now, the price that he charged for gas that could be reckoned as only 7-candle gas, was 6s. 8d. per 1000 feet; whilst the company that was promoted were ready to fix their maximum price at 5s., and to supply gas of 14-candle power. He thought that, if he called evidence after that to prove that Mr. Williams's price was excessive, the committee would not be at all surprised at his doing so. By Act of Parliament the new company would be limited to 10 per cent. dividend; therefore the parties they supplied would be perfectly certain of having gas at a moderate price. What Mr. Williams's profits were he did not know, but they must have been very high. Then Mr. Williams, in his petition, alleged that the formation of the new company would be the means of taking away his profits. It might be so, but it must be borne in mind that the promoters of the new company had not wished to deal harshly with him; they had placed themselves in negotiation with him on many occasions, but unsuccessfully, and now they were compelled to come forward and do what they considered to be only fair and proper. Mr. Williams had not fulfilled his contract, and really the town ought not to be left as it had been, with an inadequate supply of gas. The promoters had expressed their willingness to purchase the property of Mr. Williams at what they considered to be a fair and marketable price. It had been attempted to insert a clause in the bill that the promoters should be called upon to pay for the works any sum that he chose to ask and all expenses if they did not choose to agree to his terms. Naturally enough, they demurred to this, and asked the committee not to allow the insertion of such a clause, but to leave Mr. Williams to the General Act. As to the supply being adequate, that was a question in dispute, and he should be able to prove it to the contrary. On the evening of the 7th of December the whole town was in darkness in consequence of the inefficient supply. There was not a public light in the whole district, and this state of things the local board naturally wished to rectify. On more than one occasion the railway station had been suddenly enveloped in darkness, the gas in the market-house was turned off at half-past ten or eleven o'clock, and altogether it was evident that Mr. Williams was not in a position to supply Brynmawr as it ought to be. He could only supply 4500 cubic feet, whereas the quantity that was required was something like 15,000. In any arrangement that might be come to with respect to the new company purchasing his works, the petitioner asked for costs. If this bill had been brought in vexatiously he might in justice have made such an application, but he (the learned counsel) thought that when the committee had heard the case for the promoters, they would be of opinion they had done all they could to uphold the interest of Mr. Williams, and that now that they had been obliged to come to Parliament they had done nothing more than they were obliged to. The questions for the committee to consider would be the existing supply, the price, the amount of pressure, the cost of production, the mode of testing, the maximum supply, and so on. The site which the promoters had selected for their new works was objected to by nobody; it was on the estate of Mr. Crawshay Bailey, and was well situated, very convenient, and admirably adapted for the purpose.

The COMMITTEE thought it was a pity that the promoters and Mr. Williams could not agree as to the purchase of his works without going to Parliament.

Mr. SOMERSET said the promoters were very anxious to come to terms, but the clause which Mr. Williams wished to have inserted was very objectionable. That clause stated that the town was now supplied with gas from the works belonging to Mr. Williams; that if the said Mr. Williams should within three months after the passing of the Act, by notice in writing, require the company to purchase his works, pipes, mains, and so on, save and except a house and brewery, then in such case the company should be required to purchase, and the said Mr. Williams to sell, at such sum and upon such terms as should be agreed upon; but, in case no agreement should be come to within one month, then the property should be purchased at such an amount as should be determined on by arbitration under the Lands Clauses Act, and the costs and expenses be paid by the company. He submitted that the question as to whether the promoters were dealing justly with Mr. Williams, after he had enjoyed a monopoly of 18 years, should not affect the ruling of the committee as to whether the town and district of Brynmawr required more gas than it at present was supplied with. He was in the hands of the committee, and would proceed to prove the preamble of the bill if they wished it. His case upon the clause referred to was twofold; first, he said that it would be unfair to the promoters, and secondly, that as Mr. Williams had enjoyed a monopoly of the town for 18 years, and had not supplied the town as efficiently as it ought to have been, and as the inhabitants required, he had no right to such a clause being inserted in the bill. If the committee would give the preamble he should not, of course, call witnesses to prove it.

The COMMITTEE could not give the preamble without hearing what was to be said against it. If the opposition consented to the preamble the committee would not object.

Mr. HUTCHINSON said that all he wanted was, that his client's position and interest should be recognized. He thought he should ask for the preamble to be proved.

Mr. SOMERSET said that he was either to prove the case on the preamble or not. If he was to prove the case on the preamble, then he should go into the whole question. If his learned would let him have the preamble, he would merely confine his attention to the clause and the suggestions made by the committee.

The COMMITTEE said that if Mr. Williams's agent wished to dispute the case, Mr. Somerset would have to prove it. The committee would proceed on the point as to what compensation should be made to Mr. Williams for the deprivation of his works.

Mr. HUTCHINSON observed that if Mr. Somerset would adopt any remedy which he might advise his client to adopt, and then take the preamble, he should not object.

The COMMITTEE would consider the principle of compensation on the clause. They would go into that immediately if Mr. Hutchinson would consent to the preamble.

Mr. HUTCHINSON did not think he should be acting in justice to his client unless he asked the promoters to prove the preamble of the bill.

Mr. SOMERSET then proceeded to call the following evidence:—

Mr. *George Hicks*, examined by Mr. SOMERSET.

I am the chairman of the Brynmawr Local Board of Health, which body was instituted in 1857. I am largely engaged in business there. I was there when the petitioner, Mr. Williams, commenced his gas-works in 1848. They are situated in a street having buildings on both sides, and they cannot be enlarged under any circumstances whatever. [Witness pointed out the position of the works on a plan]. The first charge which Mr. Williams made for gas was 7s. 6d. per 1000 feet, and by contract, 12s. 6d. and 15s. per light. These charges were made from time to time to time, and parties became dissatisfied. Meetings were held on several occasions, commencing about twelve years ago. Public-houses were charged 15s. per quarter for each light they had. The charges for fittings were exorbitant. Mr. Williams reserved the right to supply them, and the charges were quite 300 per cent. above what was thought to be fair by the public. I have been a customer of Mr. Williams for eighteen years. The gas he supplied was extremely bad indeed. Certain parties, who had been supplied by the quarter, complained in consequence of the high price. Public meetings were held, and in 1858 all the matters of complaint were submitted to the Local Board of Health. Mr. Davis (the solicitor and clerk to the board) proposed certain terms, but Mr. Williams refused to comply with them. Eventually the price of gas was reduced to 6s. 8d. per 1000 cubic feet, the present charge, but this was only effected after some years of discussion. In 1859 the local board, being desirous of supplying the town with better gas, applied to Mr. Williams, but they failed to come to any arrangement with him, especially as to price. In 1863, a committee of the board was appointed, and Mr. Williams then said he was not in a position to supply the public lights, as he had not the means of doing so. Mr. Williams cut off the gas of certain parties who had objected to the exorbitant charges, and had refused to pay. The town was very frequently in darkness. I remember the 7th of December last. Thursday is a half holiday; the shops are then closed, and, consequently, they do not want gas. Divine service is held on Thursday evenings on account of having a supply of gas during the time. On the night of the 9th of December, market-day, the town was in darkness, owing to the want of gas. This has happened very frequently. The gas is turned out at twelve o'clock each night; but it goes out frequently at all hours between eight and twelve. The wind sometimes puts the lights out. A site has been obtained for the new works on property belonging to Mr. Crawshay Bailey, which is convenient in every way. The market-house is not lighted for want of gas. The feeling of the district with regard to these things is that a company is wanted; the people are sore and annoyed, and would do everything in their power for the purpose of getting it. I am one of the directors of the new company. The directors are all members of the Board of Health, except one or two of them. The local board petition as a board in favour of the bill. The inhabitants will support the bill by subscription. Of the £10,000 required, about £6000 or £7000 has been subscribed in the neighbourhood. It is a great coal and iron district around Brynmawr. I was at the Brynmawr railway station one evening, in 1862 or 1863, when the gas went out altogether. There was no opposition against gas being supplied in any part of the district, except Brynmawr, and the sole petitioner against the bill was Mr. Williams himself.

Cross-examined by Mr. HUTCHINSON: There has been an opposition at Blaina by Messrs. Levick and Simpson, the owners of gas-works there, and a clause was inserted in the bill to meet their opposition. Those gentlemen did not now appear. There is no clause respecting them in our amended bill. I cannot say whether the gas at the station has gone out altogether since 1863. The congregation attending Redruth Chapel have, owing to the defective supply of gas, established a small gasometer of their own. Divine service at Brynmawr was changed from Wednesday to Thursday each week on account of the bad supply of gas. Mr. Williams offered to light the town in 1859 and since, but the terms were such as the board could not agree to. There was no offer to light the town in 1863. Mr. Williams's son had said they were not in a position to do so. I can show, in the minutes of a meeting in 1859, the offer of Mr. Williams to supply the town. In July, 1863, the clerk to the board was directed to ascertain from other towns in the neighbourhood the price of gas as supplied to the public lamps, and so on. On the 21st of that month the returns obtained by the clerk were laid before the board, and were deferred for consideration till the next meeting. The result was, that Mr. Williams's son withdrew the offer. The son, I believe, was then in co-possession of the works. I never heard the right of the son disputed, except by Mr. Williams himself, when the son took the managership under him. Mr. Williams was under confinement from illness when the son had the management. We looked to the son as the authority. We received no direct withdrawal from Mr. Williams as to his lighting the town. The local board are still willing to accept his offer, but are satisfied that he is not in a position, with his works, to give the supply. We never proposed any price at all. No enlargement of the works would be permitted by the local board. There was no area for an enlargement where they were situated.

Re-examined by Mr. SOMERSET: Mr. Williams's son had the management of the works before his father was confined.

The COMMITTEE here said they found that no one had a *locus standi* in respect to this bill except Mr. Williams, the petitioner.

Mr. *David Edwards*, examined by Mr. SOMERSET.

I have carried on business for a great number of years at Brynmawr, as a general shopkeeper, and am owner of considerable property there, including the market-house. The gas supplied to the town has been bad. It is a little better than it was, but it is by no means regular. I want the bill. It is required by the inhabitants of the place greatly. I know of the propositions made to Mr. Williams to supply the town with gas. I remember, when I was a member of the board, bringing forward a motion for lighting Beaufort Street; but we found that Mr. Williams's terms were so high, that we could not agree to them. I want the market-hall lighted on business evenings. I cannot get it lighted now, because the price will not do. The present charge is 6s. 8d. I corroborate the evidence given by the last witness.

Cross-examined by Mr. HUTCHINSON: I should say that gas would be the best artificial light for lighting a market-house. My customers mostly bring their own lights now. I am continually troubled with them as to the manner in which they stick their candles about.

The COMMITTEE said they ought not to be troubled with such questions as to whether gas was the best article for lighting a market-house.

By the COMMITTEE: I should have to charge about 6d. per stall per night for gas, if it was used now. The present price of coal is about 8s. 6d. per ton.

Cross-examination continued: The area over which the mains now extend is smaller than the district of the local board of Brynmawr. There has been some improvement in the gas of late years.

By the COMMITTEE: The gas is turned off some time before morning. I am a director of the new company. In forming the company we were desirous of coming to terms with Mr. Williams, but we decidedly demurred, accepting the clause he proposed, and a settlement under the Lands Clauses Act.

Mr. SOMERSET said he had a number of other witnesses, who would give evidence to the same effect, but he would not trouble the committee with hearing them. He would merely call the engineer and the clerk to the board to prove certain facts necessary to prove the preamble of the bill.

Mr. *F. D. Steele*, examined by Mr. SOMERSET.

I am engineer for the new works. The estimate, £9293, is sufficient. The site is very convenient for all purposes. It is on land belonging to Mr. Crawshay Bailey. I purpose to supply 14-candle gas at a maximum rate of 5*s.* per 1000 feet. I have visited the works of Mr. Williams.

By the COMMITTEE: The extent of piping which I propose to lay down is 8700 yards. That will supply the district of Blaina, Llangattock, and Brynmawr. The estimate will be sufficient to erect works competent to supply plenty of gas, and to lay down mains, and so forth. There are small gas-works at Beaufort, the proprietors of which do not oppose the bill. The 5*s.* per 1000 feet is to be the maximum price, and after 10 per cent. is realized the company will have to reduce their price.

Examination continued: Mr. Williams is charging 6s. 8d. for gas; that is 9-candle gas in the maximum. The gas sometimes may be only 7-candle gas. I have visited his works. They can only supply 4750 feet of gas—not sufficient, of course, to meet the requirements of the town. A gasholder of three times the size of the present one is required. Any extension of the works would be impracticable.

By the COMMITTEE: In our works we propose supplying four times as much as Mr. Williams's now do, which would be enough for the whole district. I cannot say whether there is any proposal to stop Mr. Williams's works.

Mr. SOMERSET: Oh! no; we do not propose to stop Mr. Williams's works. We wish to deal fairly with him, and to allow him to supply in competition as long as he chooses.

Cross-examined by Mr. HUTCHINSON: There is land at Mr. Williams's works, on which coal is stacked. It adjoins a brewery, and any extension of the works would be impracticable. Most likely he would use the same kind of coal as ourselves, but his purifiers are too small to give the quantity of gas required.

Mr. *Cox Davis*, examined by Mr. SOMERSET.

I have been since 1851 clerk to the Brynmawr Board of Health, and am solicitor to the bill. I have heard the complaints from time to time, and was, on one occasion, at the Brynmawr station when the gas went out altogether. Mr. Williams's right to break up the streets was disputed some time ago, and he, to prove his right, went to the Queen's Bench. The case of his breaking up the streets was heard before the magistrates afterwards, and Mr. Williams was convicted and fined. I advised the board that they had not the power to give Mr. Williams authority to break up the streets, as if they did they would be liable to an indictment. I have been engaged in settling negotiations with Mr. Williams as to the purchase of his works from time to time, and there was a desire at all times to deal fairly with him.

This was the case as far as the preamble was concerned.

Mr. HUTCHINSON said that the questions he had put in cross-examination were to remove any impression that might exist as to the works of his client. No doubt the supply at times had been deficient, but he was instructed to say that it arose from accidental circumstances, over which Mr. Williams had had no control. Mr. Williams, the committee would be pleased to remember, had, by arrangement with the Duke of Beaufort, established his works, and had expended his capital largely in their extension, with the object of supplying the town as fairly as he possibly could do. Now a new company proposed to come into the district as competitors, and being a company under parliamentary powers, they would at once render Mr. Williams's works useless. They would have power to break up the streets and lay down mains, and to do other things which Mr. Williams could not, and he would be prevented from realizing that return which he ought to. Under these circumstances he (Mr. Hutchinson) simply asked that justice might be done him.

The COMMITTEE said they were unanimously of opinion that the preamble was proved, and they would proceed to the clause as to the purchase requiring the promoters to purchase the works within three months, at such sum as might be agreed upon; and provided that such an agreement was not come to, to order the sum to be determined under the Lands Clauses Consolidation Act, the promoters paying costs.

Mr. SOMERSET was sorry to be obliged to object to the clause on several grounds. The committee had heard from his witnesses what the new company were desirous of doing. They wished to negotiate successfully with Mr. Williams, and he had no hesitation to state the terms they had offered, but to which Mr. Williams unfortunately had not agreed. If the committee should think that Mr. Williams was entitled to exceptional legislation, he would ask them to be good enough to lay down the principle, and then there would be no difficulty about it. With regard to the clause, they objected to it, of course, because, if they agreed to it, they would be obliged to purchase the works at whatever price might be fixed upon, and to pay the costs; which, in fact, would be putting a large burden upon them, and which they maintained would not be right after Mr. Williams had enjoyed a monopoly in the supply for the long period of 18 years. The demand made upon them might be ridiculous and absurd, and yet they would be compelled, under such a clause, to pay it, and, moreover, to pay all the expenses besides; and again, they were to purchase without any legal title being given them. He thought these things would be quite conclusive to show the injustice of the clause. Why, he would ask, was Mr. Williams to be put in a different position from any other person or any other company? The committee had been kind enough to pass the preamble, and he (Mr. Somerset) might take it that the committee thought that the town required to be better supplied with gas, but why exceptional legislation should be made for Mr. Williams he could not understand. The promoters had offered at one time to purchase his works, and to recompense him reasonably for any loss he might sustain, and what more could they do? If the works were not purchased, Mr. Williams would still be in a position to supply the town, and he should think that after he had had a monopoly of 18 years he ought to be able to compete with them successfully.

The COMMITTEE: But he is restricted by the local board; he cannot take up the roads to lay down or repair his own mains.

Mr. SOMERSET: No, he could not do that.

The COMMITTEE: Well, how could he compete if he had no power.

Mr. SOMERSET must admit that he could not compete further than he did at present. The local board could make an exception if they chose.

The COMMITTEE: Would it not be an illegal act for him to break up the streets?

Mr. SOMERSET: Certainly, without the permission of the local board. Of course if they refused permission Mr. Williams's hands would be tied. The local board, he wished to say, were not to be considered as the promoters of the bill.

The COMMITTEE: Could not any one prosecute in case the streets were illegally broken up, as well as the Local Board of Health?

Mr. SOMERSET: Yes, any inhabitant.

The COMMITTEE: Would not that show that Mr. Williams would have no power to compete with the company?

Mr. SOMERSET was in the hands of the committee. He confessed he felt the difficulty, but the question was, whether such a restriction would ever be carried out. It would be a question for the committee to decide. He knew very well that if the inhabitants were to say that Mr. Williams should not repair his mains he could not do it. He felt the great force of the objection, but would ask the committee to consider whether the local board, who were the representatives of the inhabitants would be likely to do anything that would prevent Mr. Williams from supplying the town in future. Mr. Williams had placed himself in the position in which he now stood as being unable to supply the town as it ought to be. He had been in the same position since 1851, and would still be after the bill was passed. Mr. Williams asked the promoters to buy his works; they said they were a nuisance; they were in the centre of the town and could not be enlarged. If the committee said they would make the promoters buy the works they would bow respectfully to the decision, but after all the question was one of legislation, and why should the case of Mr. Williams, who had had a monopoly for 18 years, be made an exceptional one. He should be wasting the time of the committee if he were to argue the point any longer. If they thought that exceptional legislation in this case was necessary, he would ask them to lay down the principle by which they could be guided.

The COMMITTEE: Will you lay before us the terms you offered?

Mr. SOMERSET: The terms came at last to £2000. If the committee wished for further information he would call a gentleman who could give it.

The COMMITTEE: Did you make that offer under the idea that you would have to compensate Mr. Williams, or that he had some claim on the Duke of Beaufort?

Mr. SOMERSET: I cannot answer that. With regard to the claim upon the Duke of Beaufort, he would respectfully submit that it had nothing to do with the question.

Mr. *Hicks* was recalled, and said that a proposal was made to purchase the whole of the property when it was offered for sale in 1863. I and others went to Mr. Walford, the solicitor to the mortgagees, at Abergavenny, to negociate for it. He told me that the price for the gas-works, brewery, and house, was £2000. There were two mortgages on it at that time; £700 was the amount of one of them. We did not make this offer in order to satisfy him for the claim Mr. Williams might have against us. I agreed to buy the property for £2000, but, when it was being conveyed, Mr. Williams refused to allow the purchase to be completed, and I did not go further into the matter. Since then Mr. Davis has been in negotiation for the purchase of the works. The sum of £2000 would have included the works, piping, and everything connected with them, and it included the house and brewery.

Mr. *Walford*, examined by Mr. SOMERSET.

I am a solicitor at Abergavenny. I heard the evidence of the last witness. At the time when the negotiations took place in 1863 I was concerned for the second mortgagee, the first being the Bridgewater Building Society. Mortgagee No. 2 negotiated for some time unsuccessfully with Mr. Williams, for repayment of the money. The brewery was unlet, and was considered to be almost useless. The price fixed was £2000 for the entire property, subject to the mortgage of the Bridgewater Society.

By the COMMITTEE: We understand that the profit of the works had been estimated at from £200 to £250 a year. The brewery, I am told, is now let for £50 or £60 a year. Had Mr. Williams been my client, I should have advised him to sell the property, in order to get out of his difficulties, provided there had not been a higher price offered. There was an offer of £2200. Mr. Williams succeeded in paying off the second mortgage, and therefore all negotiations went off. Mr. Williams never consented to sell the property for £2000.

Mr. *C. Davis* was recalled, and said that he endeavoured to make an agreement with Mr. Williams, and offered him £2000, and that was subsequently confirmed by a resolution of the directors, when the new company became more advanced. We offered £2000 for the gas-works alone, but it was refused. Mr. Williams proposed to sell for £3000.

Mr. *Steele* recalled: As to the utility of the works, I would rather be without them; they are unsuited for the manufacture of gas in an economical way. They are insufficient in every respect. The mains are badly laid, and to supply gas from such works would be detrimental to the company. I have strongly advised that the works are of no value at all. Nothing better than 9-candle gas could be produced from them; 14-candle gas could not be made in those works.

The COMMITTEE: Do you propose to lay mains down in that part of the town which Mr. Williams at present supplies?

Witness: We shall do so at once.

The COMMITTEE: Then Mr. Williams's works would be shut up.

Witness: No; he could still compete with us if he chooses to do so. Of course, if we supplied a better article, we should get the most custom.

The COMMITTEE thought it a pity that the matter could not be settled between the parties. It was a matter of compensation, which was much better settled by the parties themselves than by a committee. Was Mr. Hutchinson going to show how he made a claim against the company? The committee

wished to know how he could show that his clients had a right to come there and oppose the bill, claiming compensation besides.

Mr. HUTCHINSON said their answer was, that they would be injuriously affected by the bill.

The COMMITTEE: What claim have you to compensation?

Mr. HUTCHINSON: May I ask what claim the promoters have for their bill, when the town has already been well supplied? The formation of the company would result in driving Mr. Williams out of the field. This company, having parliamentary powers to break up the streets, would soon ruin his client, who had no such powers given to him. It was not likely that the company, most of whom were members of the Local Board of Health, would give Mr. Williams power to break up the streets now, any more than they had done.

The COMMITTEE: That does not tell us that he has any claim upon the company for compensation.

Mr. HUTCHINSON: The counsel for the promoters had said it was not a case for exceptional legislation, but I shall submit that Mr. Williams ought to stand in the same position as Messrs. Levick, Simpson, and Co., who had get a clause protecting them in their own district at Blaina. I will ask the committee to do justice to my client, and remember that he had expended his capital in the construction of the works, and he had endeavoured to supply the town with gas as far as he possibly could. He said—"Do not shut me out by placing me in competition with a company having greater capital and greater powers to break up the streets than I have; at all events, purchase my works, and make me compensation for the capital I have expended." I am perfectly willing to leave the matter in the hands of the committee, for them to determine the price at which the works should be sold. Before I proceed further, I will put in my client, and examine him as to his works, and the amount they have cost him.

Mr. *Williams*, examined by Mr. HUTCHINSON.

I have been offered by the promoters £2000 for the purchase of my gas-works and brewery, but I have not accepted it. I am not in a position to sell the brewery, because it is let to other parties on a lease. I have carried on the gas-works since 1848, and from the result of my calculations I feel that I am not justified in accepting the offer of the company. Two years ago I was offered and refused £1200 for a moiety of the works. Mr. Hicks has offered to take the works at £220 a year and keep them in repair.

By the COMMITTEE: I consider the profit is about £350 a year, under the present circumstances. The apparatus for making the gas was put down in 1848, but since then there have been some new retorts and new mains put down. The works are not old-fashioned ones. I always thought that I had power to break up the streets under agreement with the Duke of Beaufort, the lord of the manor. I should be liable if I attempted now to break up the streets to repair any mains that might be defective. If the company wish to interfere with me I presume I have some claim upon them. I never thought of bringing in an Act of Parliament myself, and did not think I required one till my power to break up the streets was disputed in 1858. Since then I have not had the means of obtaining an Act. I have extended the works out of capital. I cannot undertake to say what the value of my capital would be. The business has scarcely been remunerative during the 18 years, considering the money I have expended in improving it.

Mr. SOMERSET would ask the committee to leave the petitioner to the law of the land. If he chose to go to a jury for compensation he might do so, but surely the committee would not allow him compensation when it was clearly said that he might have a claim upon the Duke of Beaufort. Should the committee give compensation and make this an exceptional legislation, of course it would not prevent him from obtaining compensation from the duke, and this he wished the committee to bear in mind. With the promoters money was a matter of moment.

The COMMITTEE thought the meeting which had been held of the ratepayers showed the feeling that existed in the town with respect to the new works, and the desire that no injury should be done to Mr. Williams. It was clear that in the minds of those present Mr. Williams would have some claim if the new company was established.

Mr. SOMERSET said he would admit that everybody in the town wished to do only that which was right towards Mr. Williams. The promoters were willing to let Mr. Williams keep his works and to give him £1000.

The COMMITTEE: If you allow him to keep his works, and prevent him from repairing his mains, it comes to nothing more than a joke. The local board ought to give Mr. Williams permission to repair his mains.

Mr. SOMERSET said that if a clause was put in to that effect the promoters would not object to it; but they could not give the permission, as that lay with the local board.

Mr. HUTCHINSON said that if the promoters would leave his client alone, not take his works, or offer to oppose him should he come to Parliament to extend his area, he would be satisfied.

Mr. SOMERSET would accept that proposal, and would meet his friend if he could do so.

The COMMITTEE again thought it a pity that the matter could not be amicably settled in some way or other.

Mr. SOMERSET wished to save his clients expense, and would consent to the proposition.

Mr. HUTCHINSON said that the promoters would be excluded, of course, from the district in which Mr. Williams's mains at present extended.

Mr. SOMERSET dissented to this.

The COMMITTEE: You wish to maintain the existing works?

Mr. HUTCHINSON: We ask to be left alone.

Mr. SOMERSET: I am afraid I must ask the committee to adjourn. I have endeavoured to settle this case, but cannot.

The COMMITTEE: If you cannot agree, you must leave it to us to decide.

Mr. SOMERSET said the proposition was that they should not, directly or indirectly, oppose Mr. Williams should he come to Parliament hereafter.

The COMMITTEE asked if the promoters would agree to the proposition that they should not prevent Mr. Williams from supplying the town with a better gas in future.

Mr. SOMERSET declined, not being willing to accept the proposition in that form.

The room was then cleared, and after a long consultation the public were again admitted, when the chairman said the committee had decided upon passing the clause referred to, leaving out the proviso as to costs, &c. The clause stated that the town of Brynmawr was now supplied with gas, and that if the petitioner or his representatives should, within three months after the passing of the Act, require the company to purchase the works, with the exception of the house and brewery, the company should be required to purchase them, and Mr. Williams required to sell upon such terms and conditions as should be agreed upon between them. Should the agreement not be satisfactory, then within one month the compensation to be made to Mr. Williams should be under the Lands Clauses Compensation Act.

Mr. SOMERSET asked for the word "partially" (before "supplied with gas") to be added to the clause, as it might affect the compensation.

The COMMITTEE allowed the addition to be made.

The other clauses of the bill were then taken *seriatim*. The one fixing the maximum price of the gas to be supplied by the new company was objected to by the committee, who thought it exorbitant, especially in a coal district like Brynmawr; 4s. ought to be the sum.

Mr. *Steele* was recalled, and gave the reasons why he fixed the price at 5s. The district was a scattered one, and considerable expense would necessarily be involved. There would not, besides, be a good sale for coke in that locality.

Mr. *Hicks* said the greatest number of lights which the new company could expect would be only about 350, and putting them at £1 each the revenue at a less price than 4s. would not be sufficient to carry on with. The price of gas at Aberdare was 5s.; Tredegar, 5s.; Dowlais, 5s.; Merthyr, 5s.; Newport, under a local Act, 4s. 6d.; Abergavenny, from 5s. to 6s., with coal at 8s. per ton; Crickhowell, 7s. 6d.; and Brecon, 5s. per 1000 feet.

The COMMITTEE thought that 4s. was the maximum at other places, and that it ought to be charged here.

Mr. SOMERSET said that price would certainly not be remunerative. The old works would have to be purchased at a considerable outlay, notwithstanding their belief that they would be almost useless to the company.

The COMMITTEE ultimately sanctioned 5s., and passed the clause, but expressed their opinion that the charge was excessive, compared with that of other towns.

Mr HUTCHINSON applied for costs, but

The COMMITTEE said they were not inclined to give them.

(*Before the Referees—Mr.* SCOURFIELD, *Chairman; Sir* W. G. CRAIG, *and Mr.* HASSARD.)

WORKSOP AND SHIREOAKS GAS BILL.

FRIDAY, MAY 11.

Mr. RODWELL, Q.C., and Mr. WILKINSON, appeared for the promoters; Mr. BURKE, Q.C., Mr. RICHARDS, and Mr. LUMLEY SMITH, for the petitioners.

Mr. RODWELL said he would, in as few words as possible, detail the object of the proposed bill, which was for granting powers to the Worksop New Gas Company, on grounds which he trusted would meet the approval of the referees. The objects of the bill were expressed in the preamble—namely, for better supplying the large district of Worksop and Shireoaks with gas. The manner in which the public had been supplied to the present time would be briefly explained, as he did not propose to detain the referees with any lengthy address on that occasion. In the first place, he would state that the present company was established in 1847. It would be incorrect perhaps for him to call them a company; they were an association, and the works were in the hands of a few individuals for the purpose of supplying the district with gas. Their capital was small, and he believed the money they had expended was spent in a very useless manner; and thus matters went on till 1856, when they obtained an Act of Parliament, and raised their capital to £15,000, of which sum £6000 was to bear dividend at the rate of 8 per cent., and 7 per cent. on the remainder. Their maximum charge for gas about 1857 was 5s. 10d. per 1000 feet, but since that time the company had reduced it to 5s., and the more fortunate of the proprietors had been receiving their full dividend upon the amount of their shares to which they were entitled by law. The consumers of gas had for some time past been dissatisfied with the price at which they were charged, and they thought the time had arrived when they could get a much cheaper and a better article than that with which they had been supplied; and therefore in the bill which they now brought before the committee, they asked for powers to enable them to supply themselves at a very reduced rate. Before proceeding further, he should state that in 1847, when the present company was established, the population of Worksop and the district was much smaller than at present. Worksop, in fact, was a place that was increasing daily in importance, and since the mineral supply of the district had been developed, the number of houses had increased, so that what was sufficient in 1847 as regards the supply of gas was insufficient now. The population of the district the new company sought to comprise was something like 9000 inhabitants. There were railways intersecting Worksop; there were very large works there, and throughout the whole of the district trade was increasing, commerce was increasing, and the population was increasing; so that in point of fact the present company, if they were disposed, were incompetent and unable to supply the wants which had grown up since the formation of the works in 1847, or since the reduction ten years afterwards. The company had been paying 8 per cent. upon £6000 of their capital, and 7 per cent. on the remainder; and he should be able to state to the committee that in the opinion of the promoters the £6000 upon which dividends were paid was a most unproductive outlay. It was paid for the land and works of the original company, which the consumers say were not as productive as they ought to have been. He would not say but this alone would have instigated the promoters to have come forward with their bill, but the fact was that the present company had been most arbitrary in their dealings with private individuals, and most unaccommodating to the Local Board of Health, who were giving their most cordial support to the present measure. The new company had arranged to give the local board a supply—a supply which they could not obtain from the existing company, who virtually had said: "We will do no more than the law compels us; if you go to Parliament and attempt to drive us to any other arrangement, we have capital enough to beat you." That had been their tone all along. The learned counsel would show that the public and private inhabitants not only had been badly supplied, but had been treated by the existing company in a manner they ought not to have been. When asked to put down additional mains they had said, "Oh! no, we will not; you must go without gas." The consequence was, that many people were deprived of gas by the company, who refused to take it to their dwellings, and others were debarred from consuming it because the price was exorbitant. Therefore, he (the learned counsel) represented two classes of individuals—those who were deprived of gas by satisfactory proceedings on the part of the company, and those who said they would not buy gas at the price. In the bill of the new company they proposed to insert 4s. per 1000 feet as the maximum price for the first two years, and then to reduce it to 3s. 9d.; the local board to be charged 2s. 6d. for the supply to the public lights. In a population with 1800 dwelling-houses the difference would be considerable and would be equivalent to a reduction in the rates, because people would use gas if cheaper, whilst the company would be able to secure a far better article than the present company supplied. He (the learned counsel) had said that the existing company had exacted the remainder of their dividend upon the £6000. It was a marvellous coincidence to find that they had received in the last year £984 4s. 1d., which, with the exception of that 4s. 1d., made up the precise difference of 8 per cent. on the £6000 and 7 per cent. on the remainder of their capital. It was a marvellous coincidence, he said, that the company had so arranged their figures as to be able to declare dividends on the above amounts with the exception of that identical 4s. 1d. This, the public said, required explanation. Another fact which required conviction, and which

would be deposed to the committee by scientific witnesses, was, that the company had actually charged for more gas than had been manufactured; that was to say that the quantity of gas they had charged for was far more than could have been produced by the quantity of coal they had consumed. The basis of their calculation was, that every ton of coal produced 9000 feet of gas. He found that in the year 1851, 60,000 feet of gas were charged for more than had been consumed; in 1858, the quantity was 99,000; in 1856, 509,000; and in 1861, 677,000; and there was no allowance made besides for leakage. The accounts of the company, too, were most unsatisfactory; they had never been filed as by Act of Parliament the accounts of other companies were required to be. This was a most unsatisfactory state of things. He should put in tables to show that the calculations which the promoters had made were accurate, and that the facts he had stated were absolute ones. With regard to the purity of the gas, he believed the committee would have the benefit of some fittings lately used in the town to show that the gas was impure; in fact, the existing company had no means properly of purifying; at least they had not adopted proper means of purification in their manufactory. The new company had a capital of £10,000, and had already got promises of £2000. They were not a company of contractors, they were composed entirely of the inhabitants of the town and district, and they came before the committee *bonâ fide* for the purpose of securing a good article at a fair price. In addition to the amount subscribed he was in a condition to prove there were parties in the town and immediate district who were willing to make up £5000 more of the capital that was required. They could, therefore, say they had a capital raised to the amount of about £7000. They had, besides, the support of the Local Board of Health, whom the new company had agreed to supply with gas at a cheap rate, public attention having been called to this by various meetings which had been held in the town. Those meetings had been held some in February last and others later, and it was decided to give support to the company who were able to afford a better and cheaper supply of gas than had been afforded heretofore to the town of Worksop and the neighbourhood. At those meetings, too, it was decided to give support to the local board, and they were requested to take such steps as would pass the bill before Parliament. They asked the committee to give the company protective powers, so that their gas might be of proper illuminating power, to see that it was of the proper standard of purity, to give power to appoint a person to test the same, and to take proper control of the public lamps. He stated these things because he wished to show that they had been discussed at public meetings. The Local Board of Health had gone thoroughly into the question, and had reserved to themselves certain rights, which had been introduced into the bill; and in the amended copy the committee would find there were clauses giving the Local Board of Health the powers which they sought to obtain, and which they could not exercise under the present state of things. Every one, he thought, would agree with him that the supply of gas to a town should be, as far as it possibly could, in the hands of a company, so that the public should not be left to the mercy of shareholders and their monopoly. The shares of the present company, he believed, were in the hands of seven consumers; they were in the hands of a few people—a family party—to whose dictation the public did not wish to submit. There was a petition presented by the Local Board of Health, but that the committee would see was only for the purpose of securing those clauses which had been introduced. The petitioners, in their petition, said they believed the bill would be found to be good for the town; they treated it entirely as a public question, independently of the interest of the shareholders, and they, it must be observed, were the only public body who had a right to interfere. They were in favour of the scheme, and they asked the sanction of the committee to it accordingly. The learned counsel would next address a word or two with regard to the locality of the present gas-works. The existing works, as the committee would see by the plan before them, were in the centre of the town, and amidst a dense population. It could not be denied that the company ought to extend their works, but the promoters said it would be impolitic and dangerous, in a sanitary point of view, to increase them; they could not do so without creating a greater nuisance than they were already. The works were almost in the centre of buildings; the company had no power of expansion, and, if they had, they would, in fact, inflict a considerable injury upon the residents in the neighbourhood. They all knew how jealous the public were of anything that would be likely to interfere with the health and comfort of those who lived in certain localities. The site proposed for the new works would be objectionable to no one; and in this respect the company had the advantage over the old one. These were all the facts which he thought he need state with regard to the objects of the bill, and he would, therefore, call the attention of the committee to the two petitions—short ones though they were—which had been presented against the bill. One of them was the petition of the Worksop Gas Company, who stated that the bill contained various clauses and conditions prejudicial to the interests of themselves as the existing company, and that the preamble contained allegations which could not be substantiated. The learned counsel thought he should be able to satisfy the committee to the contrary. In the first place, in respect to coal, he might state that the coal in the district of Worksop was not an expensive article; it ranged from 8s. 6d. to 10s. per ton, and, bearing in mind the price of gas in almost all other towns in England, he thought no one could say that 5s. was a reasonable price. In almost all cases 5s. was the maximum price adopted by gas companies. At all events, the new company said they could produce a good article at a much reduced rate of profit. The petitioners said they had met the demand; but this was denied. They had practically not extended their works, and it was clear that with the old works they could not have supplied all the gas that was required. Then, again, they submitted that there was no necessity for two companies, with the number of consumers there were in the town; that the introduction of another company would be productive of a great deal of injury and inconvenience to the inhabitants. Of this he submitted that the Local Board of Health were the best judges; they said they did not apprehend any inconvenience or disturbance from the works or operations—indeed, they thought the balance of convenience would be in favour of the public, if the promoters were allowed to have their bill. The other petition was from certain of the inhabitants of the parish of Worksop. Several of the petitioners, the committee would be pleased to observe, were shareholders in the old company, and many of them dependent in some way or other upon them; they were either agents or persons employed by the existing company. This was the opposition, then, against which the promoters had to contend. In further support of the bill he should show the committee that a very large proportion of the rateable value of the property in the town and district was in favour of the bill. The Local Board of Health had expressed their opinion publicly; the public themselves had taken up the matter, and had signed a petition in favour, and they represented the most important association of the community of Worksop. Next as to supplying the district of Shireoaks with gas. It was a place situate some distance from Worksop, and the reasons which the promoters had for including it were, that it was fast growing into an important place. There were large collieries in the district, and they believed that if they obtained their bill for Worksop and the district, it would be a reasonable inference to draw that they would be called upon to light Shireoaks at some future time. There was no objection to the bill from persons living there—in fact, everybody in that locality was favourable to the scheme. It was left to the promoters to do as they pleased. The works could be of no possible harm, and it was believed that ultimately they would be of great advantage to the district. There could be no valid objection to the works, and he trusted the committee would give their sanction to the bill as it was presented before them. The learned counsel then called the following evidence:—

Mr. *Thomas J. Pearson*, examined by Mr. WILKINSON.

I reside at Worksop, and have carried on business as a draper there for about twenty years. I, as a small consumer of gas, have had reason to complain of it on many occasions. There has been an improvement in it, certainly, since November last. My neighbours share my feelings. The complaints are against the price and quality. A meeting has been called by the vicar and churchwardens, in answer to a requisition signed by about 90 people, all of whom were in favour of the new bill. The meeting was held in the Corn Exchange in February last. We considered it a large meeting. There was a unanimous feeling in favour of the scheme. I can produce the resolutions which were then passed. I have waited upon the directors of the present company, in order to get a reduction of the price. I did so in my capacity as a director of the gas exchange. We found the company very unreasonable, and we did not succeed in effecting a reduction. There was a compromise afterwards. There is a dispute still existing.

Cross-examined by Mr. RICHARDS: The dispute is in respect to the exchange meter. We believe it to be wrong. It does not belong to the company, but I believe they have power to test it. The resolutions were for better and cheaper gas. I had 40 shares in the company once, but sold them because I was disgusted with their conduct. I do not recollect whether, in selling those shares, I got a farthing profit upon them. There was another dispute, but I do not recollect when it was.

Re-examined by Mr. RODWELL: I have retired from business. The meter is supplied by Mr. White, a servant of the gas company. He takes the quantity of gas that has been consumed.

Mr. *Joseph Garside*, examined by Mr. RODWELL.

I am a coal and timber merchant and brewer of Worksop, and am chairman of the Local Board of Health. I occupy large premises, and pay about £100 per year for gas. I am one of the largest consumers, but I do not consume so much as I should do if the price was lower. I consider it prohibitory. I have turned my attention to the bill, and know the feeling of the inhabitants with reference to it. They are unanimous as to the arbitrary way in which the old company have treated them. The local board have had disputes with them. When we have applied to them for the terms with which they ought to supply us, they have refused. We wished at one time to adapt our consumption to the weather, and not be compelled to burn gas for so many hours each night. We contend that the Local Board of Health ought to have the power of lighting and extinguishing the lamps when they choose. As to the costs of the public lamps, we have been driven to arbitration, but we found we could do nothing with the company, as they referred us to the Act. The local board have had great cause to complain against the quantity of gas supplied, whilst the quality has been very indifferent. In my own house the gas has been very bad, and my rooms would have done very well for a soot-store. I am not a shareholder in the new company, but will take shares; and I am authorized to state that my friends will find more than half the capital of the company, if required to do so. It is not a contractor's scheme at all, but a *bonâ fide* one, got up by the inhabitants. The site of the proposed works is an admirable one. Worksop is a very thriving town. The population is over 5000, and the number of houses 1800. There is a large colliery at Shireoaks, and when we have a new mineral railway, which will be opened soon, I contemplate quite a double population. I have every reason to look forward to Shireoaks extending its population, and to its being lighted by a public company. I do not see any objection to the company opening up the streets for the purpose of laying down their mains. It would be for the benefit of the public undoubtedly. In my opinion, the consumption of gas will be increased in Worksop if the price is diminished. There are many people who are now deterred from using it on that account. Silkstone coal would be in price about 12s. 6d. per ton.

Cross-examined by Mr. RICHARDS: I do not see why the present company should pay 13s. 6d. for their coal. The people at Shireoaks Colliery I am not prepared to say could be supplied with gas at a cheaper rate by a private company there than by a public company at Worksop. Should the bill not be passed it will make but little difference to me, as I intend making my own gas; in giving my support to it now I merely wish to serve the public. The site of the proposed works belongs to me; I shall sell it at a fair market price, and not with any idea of making a profit. I wish to see the lighting in Worksop varied according to the state of the atmosphere, and when the evenings are moonlight I do not want to see so much gas consumed as when the nights are dark or foggy. It is my desire that the local board should have power to light and extinguish when they please, and to pay by register. I cannot speak as to the price which the company wanted when there was an arbitration. The price previously was £2 12s. 6d., but under the arbitration the cost was raised to £2 16s., and this was a source of complaint. I believe the contract was for 2040 feet per hour, or 5 feet per hour for each lamp. I am not aware of the amount which was allowed by the arbitrator for the service of the lamps. I think the public lights ought to be charged lower than those of private consumers. The district, as far as Worksop is concerned, is coterminous with the district which the existing company have power to light. The existing Act was passed in 1856. I do not know whether it contained all those clauses which are inserted in modern bills. Amongst others, there is a clause for testing the purity of the gas, and for the appointment of an inspector. That clause I consider absurd, as we were obliged to give six hours notice before it was tested. We propose in our bill to test the gas without notice. I do not think the population of the lighted area is so much as 9000.

Cross-examined by Mr. SMITH: Some of the principal streets in the town have been recently paved. I do not see any inconvenience that will arise by the mains of the new company being laid down. I look to the public good, and to being supplied with better gas than we have been.

Re-examined by Mr. RODWELL: I am not influenced in any way by the sale of my property for the proposed site. I do not think the town need be lighted when the moon is shining. I am an owner of large property, something like 100 houses, and amongst others 14 inns, and it is in the interest of my tenants as well as myself that I wish to see the new company formed.

Mr. *George Mayor*, examined by Mr. RODWELL.

I am an auctioneer and house agent, of Worksop, assistant-overseer, and collector of rates. I am agent for between 500 and 600 houses. The supply of gas hitherto has not been satisfactory either as to quality or quantity, whilst the price is exorbitant. I have complained frequently of the rise in the price. I have thought I did not consume so much as I was charged for

My bill was increased every quarter, and I could not account for it. I wrote to the secretary after I refused to pay, and was returned in arrear. The answer I received was that the amount was correct. I was obliged to pay it. There was nothing that I was aware of to make my consumption greater. The directors refused in 1864 to lay down a main in George Street, because the street was not a public one or under the control of the local board. The people in that street, with two exceptions—those living at the extreme ends—are now without gas, although they had been very anxious all along to get it. I believe if the price was reduced, there would be a much larger consumption than there now is. The company, in my opinion, treat the public of Worksop in a very off-hand manner. I know most of the petitioners against the bill; Mr. Wall is a director and also a solicitor; Mr. Watson is the clerk; and most of them are connected with the company. The petition in favour of the scheme is signed by a large number of very respectable people, some of the largest consumers in Worksop. I am of opinion it would be of advantage to the town if the new company was introduced.

Cross-examined by Mr. RICHARDS: I consider the refusal to light George Street as arbitrary. They said they would light it if I got the assent of the people to burn gas. I got the consent, but the company then said they were advised not lay down their pipes in what was not a public road. I have never understood that the company are compelled to supply persons who live within 25 yards of a main. I was charged for gas, as I expect, according to the indications of my meter. I do not think the company would wilfully record a wrong number. I was not aware that under the Sales of Gas Act my meter might have been inspected by an inspector. We have no such officer in Worksop. The price of gas is high compared with other places. I find it the highest of any of the towns I met with. I cannot mention the names just now.

Cross-examined by Mr. SMITH: I cannot say whether the auditor of the company is one of the petitioners.

Mr. *John Hickson*, examined by Mr. RODWELL.

I am a land surveyor and valuer, and secretary to the Worksop Corn Exchange and to the Assessment Committee. I recollect the introduction of the present works in 1832. Since then the population has much increased. I agree with the statements made by Mr. Garside and Mr. Mayor as to the supply and quality of the gas. As secretary to the exchange company I have had frequent correspondence with them respecting the lighting. We thought the charge was excessive without there being any increase in the consumption, and the directors of the company refused to pay. They charged £19 for the half year, when £12 had been previously charged. The bill is not yet paid. The company have never appointed a meeting for an explanation. I burn gas in my own house, but I have no cause to complain, as I have only had it for two years and a half. I know the price is higher than that charged in other towns. I am a shareholder in the new company, but to a small extent. I believe its formation will be of benefit to the town.

Cross-examined by Mr. RICHARDS: My name is put down as the new secretary, but I do not care about the office. We have not more than two or three public meetings of an evening in a year. I cannot say whether we were charged more for gas than the meter indicated. There was evidently some mistake, as the next quarter the charge fell to £6 5s. This was not for the same quarter. The meter was rented of Mr. White, who takes the quantity of gas that is consumed. I was three months without an answer to a letter which I sent to the company. I have no cause to complain of my own gas, except being obliged to employ a man about once a month to unloosen the taps, which seemed to get fastened or corroded in some way.

Re-examined by Mr. RODWELL: Our accounts for gas are sent in every half year.

Cross-examined by Mr. SMITH: I have not brought my rate-book to show the number of houses and their rateable value.

Mr. *Robert White*, examined by Mr. RODWELL.

I am clerk to the Local Board of Health and produce the reports of the Lighting Committee with reference to the supply of gas to the company. The first was for September, 1863. We advertised for tenders for lighting the public lamps. The company tendered to supply them at £2 16s. per lamp; each lamp to burn not less than 5 feet per hour. I wrote to the company on the mode of consuming the gas and the price to be paid. I also asked whether the company would agree to the board undertaking the lighting and extinguishing the public lamps. The company did nothing, but said that the board were not satisfied; they must appeal to the Act of Parliament. In consequence of this the board ultimately agreed to leave the question to arbitration, but no such meeting took place, in consequence of a member of the board stating that it was the intention of the company to reduce the price. They did not, however, make the reduction, but insisted on the tender price, and in order to avoid litigation the board agreed to accept it. The contract was only for a year, and at the expiration of it the same difficulty occurred again, and a communication was made to the company. The company did not reply, and for some time they refused to tender, and the town was lighted without one for some time. In 1864 there was further correspondence with the company, who declined to tender except in conformity with their Act, and the board had never been able to get the company to come to terms. I found that the price of gas supplied to the engine-room was much increased, and I refused to pay it. I was charged £3 12s. 6d., and ultimately they took off 10,000 feet of gas, and I paid them £1 12s. 6d. The meter stood at the figures in their book.

Cross-examined by Mr. RICHARDS: I am a printer by occupation. The meter and the book agreed; bnt the account differed from them. The clerk had furnished a wrong account. The price of £2 16s. per lamp the company have adhered to ever since. We want to pay them 3s. 6d. per 1000. There has been no quarrel, and we are here merely at the request of the ratepayers. I do not complain of the tone of the correspondence between the local board and the company. Mr. Johnson, the gentleman who expressed an opinion that the price of gas was about to be reduced, was a private friend of the secretary, I believe.

Mr. *F. Johnson*, examined by Mr. RODWELL.

I am a member of the Local Board of Health. I had a communication in 1864 with the secretary of the company, with respect to a reduction in the price of gas. It was not an official communication.

Mr. RODWELL: Then I am sorry I asked you about it.

Samuel Hughes, Esq., examined by Mr. RODWELL.

I am a civil engineer, and have had considerable experience in the working of gas-works. I have inspected the proposed site. It is an admirable one; it adjoins a canal, and works there will certainly not affect the health of the town. I find the consumption of the old company has nearly doubled during the last ten years, and the gas receipts, I believe, have increased in the same ratio, notwithstanding there had been a reduction in the price of from 5s. 10d. to 5s. I infer from this that the consumption has gradually increased, notwithstanding the advantage of high price. Worksop is, perhaps, more favourably situated than any town in the kingdom for the manufacture of gas, inasmuch as the residual products would realize more than the cost of the coal, so that the raw material was not only obtained for nothing, but there was a profit besides. The average cost of the raw material during five years had been 1½d. per 1000 sold. This was the cost of coal, less the profit. I find from the accounts of the company that nearly the whole of the cost has been repaid by the sale of residuals, proving that the raw material cost little or nothing. In 1861, the cost of coal was £377 13s. 6d., whilst from the sale of residuals the amount was £383 12s. 4d., leaving an excess above the cost of the raw material of £5 18s. 10d.; and I may say that, during the last ten years, the cost has been less than 2½d. per 1000 feet. The learned counsel had said that the gas sold appeared to be as much as the gas made. In 1859, the excess of gas sold over that made, according to his mode of calculation, was 509,500 cubic feet. In some years nothing had been left for leakage. In 1860, the loss by leakage amounted to 1½d. per cent. In 1861, the gas sold above that made was 679,000 feet, and the leakage 12 per cent. In 1864, it was 694,000, and then the leakage appeared to be about 17 per cent. In 1865, the forms of account were entirely altered, and so rendered analysis impossible. There was no account of the gas sold, and I cannot analyze the amount that was sold.

The COURT: Why is it that Worksop enjoys such an advantage for the sale of residuals?

Witness: I believe that coke is largely used in that district for malting purposes.

Cross-examined by Mr. RICHARDS: During a considerable portion of that period the company did not pay the full dividend they were allowed by law.

Mr. RICHARDS: Is it within your knowledge that the company have not paid the maximum dividend allowed by law?

Witness: I believe they have since 1860. Before that year they did not.

Mr. RICHARDS: Have they made good any back dividends?

Witness: I cannot gather from their accounts whether they have or not. I do not remember any notice of any of those dividends being paid.

Mr. RICHARDS: Is it remarkable that the sale of the residuals should exceed the cost of the material?

Witness: Yes, it is. I think they might have made up the deficiencies of the previous dividends. Extravagant working, no doubt, prevented the company from realizing the dividend they ought to have. My calculation is made on the gas sold. I believe the price of coal to be about 7s. 6d. per ton at Worksop.

Mr. HASSARD: The amount received for coke is a very large per centage on that paid for coal.

Mr. RICHARDS: A very large proportion indeed.

Mr. HASSARD: Sometimes it comes very near it.

Mr. RICHARDS: Does it not strike you that you are wrong about leakage; is not 8½ per cent. remarkably low?

Witness: Rather lower than we might expect, but not much lower.

Mr. HASSARD: The accounts are based upon hypothetical figures, and it is useless to pursue this line of questions further. The tonnage is not stated, and we cannot take the leakage without it.

Mr. RICHARDS: When were you at Worksop about this bill?

Witness: In March.

Mr. RICHARDS: Who has communicated with you?

Witness: Mr. Hodding, the solicitor.

Mr. RICHARDS: You did not communicate with him before he communicated with you?

Witness: Certainly not; I am not in the habit of doing such things.

Mr. RICHARDS: You were one of the arbitrators named by the corporation?

Witness: Yes, I was.

Mr. RICHARDS: You on one side, and Mr. Barlow on the other?

Witness: No. I should never have thought of choosing Mr. Barlow as a referee. You are mistaken in the name. It was Mr. Unwin, of Sheffield. I do not know what results followed that arbitration, as the arbitrators never met.

By Mr. RICHARDS: I calculate £9000 as the cost of establishing the works.

Mr. *H. P. Forest*, examined by Mr. RODWELL.

I am an ironmonger and gas-fitter of Worksop, and supply meters. I am a consumer, and before the last four months had many complaints to make against it. The taps are constantly being stopped with a sort of deposit of a dry nature. [Witness produced several taps, showing the deposit upon them.] Some of the taps, that had been fixed for six or eight months, are stopped up entirely. It ought not to be so, if the gas is pure. I do not know what the name of the substance is, but I believe it is naphthaline—Epsom salts and black dose combined, if you like. Within the last four months there has been no such deposits. I have been blamed by many of my customers for fitting up bad fittings. I have tested gas with the consumption of candles. In one instance, at the end of four months, a clergyman, instead of being called upon to pay about 17s., was called upon to pay £3. I watched the burning of the gas throughout that time, and took the meter. I saw the secretary on the subject, and the error was rectified. I know other instances where more has been charged than the gas consumed. If gas was cheaper, the consumption would be largely increased.

Cross-examined by Mr. RICHARDS: It might be a pretty lively time for gas-fitters if the new company was formed in the town. I have never tested the purity of the gas in a regular manner. I never took off my own meter, and burned my gas for a fortnight without it. I took the old meter off by Mr. Watson's permission, while a new one was being put on. I did not put a flexible tube on my own. I burned gas during the fortnight, but not without meter. A temporary meter was put up during the meantime. I have frequently burned gas temporarily without meter when fitting up for any customers. It is frequently done.

Re-examined by Mr. RODWELL: All the gas that I burned was accounted for. There is something about the company that no one can understand—something very dark indeed.

Mr. *J. F. Porter*, examined by Mr. RODWELL.

I am a gas engineer, of much experience. I consider Mr. Hughes's estimate sufficient, and that the site for the proposed works is well situated. I think 5s. is a large price for gas in Worksop, considering how well it is situated for the raw material. I consider 3s. 9d. would be a fair remunerative charge per 1000 feet. I estimate the bare cost of production, furnished in the consumer's meter, at 1s. 8d. per 1000 feet. This was including the cost of labour and material, deducting the sale of residual products, but it does not include interest on capital. The present company have been charging a very high price indeed, but most likely they were obliged to do so, owing to the large capital which they had to pay upon, and which I consider to be greater than they require.

Cross-examined by Mr. RICHARDS: I suggest that their capital is unduly large. I cannot say whether it has been extravagantly expended or not. The capital must have been expended in a careless way, somehow or other. I believe that when the company went to Parliament in 1857, their capital was fixed at £15,000.

This was the case for the promoters.

Mr. RICHARDS then addressed the committee for the petitioners. He said they differed very materially from the Neath case. In the one they had to deal with a partnership established for a large number of years, and without restriction of any kind; it was a mere association, a mere partnership, whom they could not bind under any sort of restriction whatever, more particularly with regard to quality, illuminating power, mode of testing, and so on, which they could do where the company incorporated as all such ought to be. But this case, he maintained, differed entirely from that; his clients, the existing gas company, stood there as an incorporated company, having obtained their Act in 1856. It was alleged that they came to Parliament with a preposterous capital, and that they had not honestly and truly expended it in the improvement of their works. This, he submitted, was a matter for another tribunal, and not for that court. A capital of £15,000, paying 8 and 7 per cent. in part, was a fair per centage, and could not be objected to. He would not say anything disparagingly of Mr. Hughes, or of any of the professional witnesses; they came there as advocates in favour of the bill; they were not on oath, and their statements must be regarded as those of advocates. Assuming all this, as he thought he had a right to, the capital of the company having been overhauled, and the right per centage determined, he would ask the court to look at the complaints which had been made against the company, and he would ask them if there was one single complaint which assumed a fair and legitimate proportion against the company. Mr. Garside no doubt was a very distinguished person in Worksop; he talked very fluently, and seemed to have a great deal of feeling against the existing company. He (the learned counsel) could understand all that, Mr. Garside being a member of the local board, for he dare say the local board of that place did not like anybody else to have any power or position there but themselves. Taking it as a general rule, boards of health were about as arbitrary a set of people as were to be met with anywhere. Well, the new company came there to establish their case, and they said that the Local Board of Health had not been properly treated, because they had asked to have the power in their own hands. Mr. Garside wanted the board to have the power of lighting the lamps and extinguishing them just as they pleased, whether the nights were light or dark. He (the learned counsel) did not think that was a reasonable proposition. The existing mode of dealing with the board was at present a good one. They were only charged £2 16s. per lamp, which included 13s. 6d. for serving, lighting, cleansing, painting, &c., leaving the net charge at £2 2s. 6d. The quantity that was consumed came to about 4s. per 1000 feet, and that he contended was not an unreasonable price. As regarded the charge to the private consumer, it certainly seemed to be a reasonable price. It had been said that the price was too high comparatively with the cost of production, which one of the witnesses, Mr. Porter, put down at 1s. 8d. per 1000 feet. He did not know under what circumstances that gentleman drew his conclusions. It seemed remarkable that it had only been since 1865, with these assumed high prices, that the company had been able to pay their maximum amount of dividend. From 1855 to 1860 they were unable to pay that rate of interest which was due to their shareholders. They had a right to charge themselves with back dividends, and it seemed extraordinary, if they were making such remarkably high profits, that they had not done so. It was not shown that there had been any bad conduct in their affairs, and this was a feature which the court would bear in mind. The district which they had to supply was a very scattered one, and it might be that under such circumstances the works could not be carried on as satisfactorily and as profitably as if they had been situated in a dense population. It appeared to him that Mr. Hughes had made his calculations upon an hypothesis, and which he did not seem to have estimated correctly. He assumed that 9000 feet of gas were to be obtained from a ton of coal, and he assumed also a certain loss for leakage, but it did not appear that Mr. Hughes had given a fair basis, or had made anything like actual calculations. He had said there was more gas sold than was made, but that was an assertion requiring substantiation. With reference to the accounts of the company, the court would have an opportunity of seeing these accounts, and having a full explanation as to their mode of working. An honourable member had observed that the price received for residuals bore a large proportion to the price paid for coal. Unquestionably it was so; but with a scattered district and a thin population they could not possibly diminish their price at present. They had already reduced it from 5s. 10d. to 5s., and if they had an opportunity of going on without being interfered with, no doubt a still further reduction would be made. He would ask, did the existing company do their work fairly and well? Did they conduct their business properly and with sufficient economy? He submitted there was no proof to the contrary. They were now paying their maximum dividend; they had reduced the price from 5s. 10d. to 5s.; and, as he had stated, if they were permitted to go on, a still further reduction would follow. It must be remembered they were an incorporated company, and could not be turned out. What Mr. Burke had said about the introduction of a new company, with a second capital to be paid upon by the consumer, he (Mr. Richards) fully endorsed. In the case of Worksop, they had but a small population of about 9000 inhabitants scattered over a large area. The two districts proposed to be supplied were coterminous. It was not the parish of Worksop alone, but it included a large area, with a very scattered population. With only 9000 inhabitants to be supplied, the court was now asked to sanction the introduction of another company, a company with a capital of £10,000, and what, he might ask, would be the result of it? He did not urge the injury and inconvenience that would arise from the breaking up of the streets, or even the hardship of the company he represented being exposed to great competition, but it struck him the result would be the same as it had been all over England—they would cut their own throats for some time in unprofitable competition; both companies would reduce their price, and then combination would follow, after which the prices would be raised, and the public, as the consumers, would suffer. If, then, it was desirable to have two companies—if a competition was conducted under such circumstances as would be injurious to both of them, and finally to the public—then, he maintained, the public would not be consulting their true interests if they supported this case. He was prepared to give evidence, if necessary, as to the working of the new company, but before doing so, he would ask the court to say that the preamble of the bill was not proved.

The CHAIRMAN said the committee would hear evidence against the bill.

Mr. RICHARDS then called the following witnesses:—

Mr. *Abraham Watson*, examined by Mr. SMITH.

I am the clerk to the Worksop Gas Company and have been so for the last 17 years. The company was registered as a joint-stock company about the year 1847—about eight years before we were incorporated. The Local Board of Health were represented on that occasion. The parish of Worksop extends over about 18,000 acres, which the old company have power to light. The lighted area at present is very limited to what the area of the parish is. Shireoaks is two and a half miles from the old and still further from the proposed new works. The country is unoccupied between them. Gatleford is about two miles from the works. We have taken the gas to the extreme points of the district for the purpose of obliging the Board of Health. We have laid down 6153 yards of main exclusively for the board, on which there are only 127 consumers, or one in every 48 yards. Worksop is a straggling place, considering the number of population. The Board of Health have never asked us to lay down the mains, but they have made orders upon us to do so. By their Act of Parliament the capital of the company was limited to £15,000—£6000 of the old capital and £9000 on the new, with 8 per cent. on the former and 7 on the latter. After the passing of that Act the company did not charge their full dividend, but had done so during the last five years. They had paid none of their back dividends. As to the price that has been charged, I may say that it was originally 6s. In 1857 it was reduced to 5s., and now the company intend to reduce it still further. The additional sum charged for the public lights was added in consequence of the lamps being lit from sunset to sunrise instead of their being extinguished at midnight, as first agreed upon. We had tendered for £2 16s. per lamp. The board never agreed to it; they were always litigious about it, and the result was, we lit the town without terms. We have had no complaints whatever as to the gas—as to the pressure or otherwise. The local board have never complained. Our mains were a great deal knocked about at the time the local board put down their sewers. The leakage has increased greatly in consequence. In 1858 the leakage was 11 per cent., in 1865 it was 22. Last year the quantity of gas manufactured was 11 million feet, of which there was consumed by meter 6,939,400 feet, and by the public lamps, 1,417,000 feet. We calculate 200,000 feet as being consumed at the works. The loss by leakage was £2,453,600 feet, or 22·34 per cent. I have prepared tables showing the increase of materials. The price of Silkstone coal in 1856 was 8s. 9d. per ton; now it is 13s. 3d. per ton, being an increase of 4s. 8d., or 55 per cent. Wages had increased from 12s. to 21s. per week, being an increase of 67 per cent. Our productive mains only give one consumer to 13 yards. The dispute as to the Corn Exchange account was only about 30s. after all. They burned more gas that year than they had done previously. I have never had any complaints, either written or verbal, except during the last month, when a greater pressure to suit the Board of Health had been put on. We have worked the pressure at 18/10ths, which must have operated upon the meters.

Cross-examined by Mr. WILKINSON: I am manager of the bank, and a farmer besides. I have taken much interest in the gas supply of the town. The works were bought of Mr. Eddison for £5000, and an additional £1000 was laid out on a new gasholder. They were a small joint-stock company, and continued as such till they went to Parliament, previously to which they improved their works by expending £6000 more upon them. Our works were extended for 500 yards. There was no unprofitable expenditure at all. I gave evidence in 1856. I did state to the committee in that year that the works were insufficient before we expended our capital; that everything was pulled down, and that nothing of the old works then remained. New buildings were substituted for the old ones. We extended the works from 8 retorts to 30. It was a new construction altogether. Many of the mains were taken up as useless. I do not know whether the company made an improvident bargain, by buying the works and expending £5000 upon that which was almost worthless. Mr. Gore was our engineer. He said he gave the directors the alternative of reconstructing the works, which the directors agreed to. We have not been fortunate in our arrangements with either the Board of Health or the exchange company. I have not known meetings being held in consequence of the place not being lighted. That was before the Act of Parliament was obtained. I do not remember people going about with lamps in their hands. The 6000 yards of mains which have been laid down exclusively for the Board of Health were not laid down with reference to Worksop supply. We have nearly 7 miles of mains altogether. They have been increased almost exclusively for the Board of Health since 1856. I think I have omitted filing the receipts with the clerk of the peace. They have been published in the local papers; in the *Doncaster Gazette*, for instance. Our directors are Messrs. J. Wall (attorney), T. Morris, and R. Tivotson, of Thorlsby Park. The latter named is clerk to Lord Manby's agent. We have 49 shareholders altogether, of whom 11 only are consumers of gas. Several of the shareholders are dead. Mr. Wall is our auditor. The shareholders have full confidence that all is done that is right. Our reserve-fund is £1000. We keep increasing it every year. I consume gas for the bank. I live there. The company have purchased a house which the Board of Health had blown up with gas. The explosion was owing to the main being broken. It was bought out of the revenue; it was a legitimate expenditure, and was done to save an action at law. The cost was only £200. It is our intention to reduce the price of the gas. I have said that probably the two companies would unite after, and then there would be a rise in the price. If the new company would let us alone, we should be in a position to reduce our gas. I do not know that 95 feet per cent. in money was ever returned on the residual profits. This was as against coal.

Mr. HASSARD said that the cost of coal and the residual products nearly balanced at one time.

Cross-examination continued: The local board have complained about the pressure. They were always saying, "Put on more pressure." Mr. Garside, the chairman, frequently said so.

Mr. GARSIDE said he complained because 5 feet of gas did not pass through the public burners.

Cross-examination continued: Our leakage, no doubt, arose from the manner in which the mains were treated when the sewers were being made. The mains, whilst the sewerage was going on, were in many instances slung in chains, and the ground under them was not properly packed afterwards. Our public lights are much better than those in London. They consume 6½ feet per hour. I do not think there are 100 consumers in favour of the new company.

The COURT said they had agreed to place one petition against the other.

Re-examined by Mr. SMITH: The new capital has been appropriated to the shareholders of the old. It was only a small proportion of the works which were pulled down and rebuilt. The town was only lighted from the 1st of September to the 1st of May. The consumption had increased about 3 million feet since the reduction in price. I see no probability of an increase. The average revenue of the public lamps, 100 yards distance from each other, is about £48 per mile, and the revenue from private consumers £279 8s. per mile.

Mr. *William Bates*, examined by Mr. BURKE.

I am the manager of the Worksop Gas-Works. The ordinary illuminating power of our gas is 14½ candles, and never under 13 candles. The works are capable of making more than 18 millions. In the year ending June, 1865, 11 million feet were sent out. I have never had any complaint from the Board of Health during the last two years. Mr. Garside and others have said they had no doubt as to the quality of our gas. I have no doubt we give nearer 7 than 6 feet of gas to the public lamps. It takes three men an hour and a quarter to light the lamps. Some of the lamps may be 200 yards apart. I have found that escapes have occurred from the mains in consequence of the operations of the Board of Health. It was about five years ago. The subsidence of the soil had the effect of loosening the joints. An explo-

sion has taken place once in the Carlton Road. On two occasions when there have been explosions our gasholders have been completely run down. There was a house blown up, which the company purchased. I have never refused to lay down pipes when the local board desired it. We have a good test-room and apparatus, and we never refuse any examination whatever. The mains are in a better state now than before.

Cross-examined by Mr. WILKINSON: The principal leakage was in 1855. I should think that pretty nearly half the mains have been laid down for the lamps belonging to the Board of Health. I believe we give them for the public lamps 7 feet instead of 6. The highest meter measured 8 feet, and the lowest 5. We have 30 retorts: six of them are in size 19 by 13, and 24 16 by 13. When Mr. Hughes tested the gas in 1862, he used Thompson's apparatus. We had no governor then. He tested the gas as to the illuminating power. It was not a chemical process. Mr. Hughes did not say the test was unsatisfactory. He said the gas was good.

Re-examined by Mr. BURKE: I cannot say why Mr. Hughes was brought down. I believe he came from the Board of Health. He never complained of the facilities we offered him for testing the gas. We have room for about 30 more retorts. We make a coal-store of the retort-house now. The local board fixed the places where the meters for testing the public lights should be placed, and the result was that more gas was found to go through the burners than what was the contract quantity. I have always believed our gas to be good. I have never heard of the fittings being stopped up, and have never been asked to unstop any. Fittings will be stopped up sometimes.

Mr. *C. E. Cawley*, examined by Mr. BURKE.

I am a civil engineer, of London and Manchester, and have had a great deal of experience. I have examined the works of the Worksop Gas Company. It would be absurd to have two companies there. They could not supply us with benefit to themselves and the public; they would be expending double capital. The works are sufficient to supply the town, and capable of meeting any future demand. There is a large population there who will never take gas. I consider the price charged for the public lamps is a low one, when there is such a quantity of gas unaccounted for. I have found that the lamps do consume more than 5 feet per hour. I do not think there can be so much leakage without it being manifest to those walking through the streets. I know the company's Act. I think the company are fully protected by that, especially if the local board exercised their power. It would prevent the company from carrying on any malpractices. There can be but little doubt of the company hereafter reducing their present price. The institution of a new company might lead to a temporary reduction, but ultimately it would lead to combination, and then to monopoly and higher prices to the consumers. The existing company had been limited to 8 per cent., instead of 10 as others were, by Act of Parliament. I should not think it would pay a company to carry mains to Shireoaks, amongst the collieries there, unless there was a guarantee. If there was, the existing company could do it as well.

Cross-examined: The gas at Rochdale I do not believe is 20-candle gas. It is not cannel coal gas. It is not superior to the gas at either Salford or Bolton. Rochdale is not an analogous case to Worksop. The raw material may be as cheap. Our raw material at Salford costs us 14s. or 15s. This would be a fair price for Rochdale, if they used cannel. They did not use cannel coal, and I do not think they do now. We make about 10,800 feet per ton at Rochdale. The gas-works in Salford belong to the corporation. I cannot say whether the public lamps at Bolton are burnt by meter. Six feet per hour per lamp I consider to be extravagant and useless. At Salford our single lamps burn 2½ feet of gas of from 20 to 22 candles. I deprecate the second company at Worksop on the ground of the increased expense to the consumer. I am aware of the maximum price sought for; the existing company would soon come down to that, but not if their money was to be expended in resisting applications of other companies in Parliament, arbitrations, and so forth.

Thomas G. Barlow, Esq., examined by Mr. RICHARDS.

I am a civil engineer, of Westminster. I know Worksop Gas-Works, and the town. I do not think it desirable there should be two companies there. My experience shows me that competition of such a kind ends in combination generally, and consequently is disadvantageous to the public. I have not gone into the cost of the production of gas in Worksop recently. I did so in 1858, when I was there as an arbitrator, and found it 1s. 10½d. at the burner. It included the cost of distribution, but nothing for interest on capital. With regard to the existing works, I think they are capable of increase so as to meet any probable demand. They have the means of erecting 15 additional retorts. There would be no difficulty in supplying Shireoaks, but I did not think in 1858 it would be judicious in doing so. I have examined the public lights in Worksop lately, and have no doubt the measurement of 6 feet is true—many of them were burning 7 feet per hour. This would explain a great deal of the gas that was unaccounted for. No doubt in 1858 the expended capital did not represent the value of the works. Perhaps it is about £2000 in excess of the present value. I cannot go into the question of the capital represented by each retort; I should say that £300 is much too small. I know of no place in England so well situated as Worksop for the economical manufacture of gas.

Re-examined by Mr. RICHARDS: I should say that the cost of works would be about £1000 for each million feet of gas they could make. There have been some cases—Birmingham, for instance—where the cost has been £600 per million feet.

Mr. RICHARDS said he had a number of witnesses to prove that the gas as supplied had never been complained of, and with the consent of the court he would call them.

The court decided upon hearing them.

Mr. *Baxter*, examined by Mr. RICHARDS.

I am a churchwarden of Worksop. The gas supplied to the church has been undeniably good. There has been but one complaint during the six years that I have held office. We were short of gas, and on sending to the works were properly supplied at once. The town is well supplied, and there is no general complaint, either as to price or quality. I first heard of the agitation of the new company last year.

Cross-examined by Mr. WILKINSON: I have complained once myself, but it was a matter under my own control. I opposed the bill in 1856, as a member of the local board. Having obtained certain protection the local board had since then been perfectly satisfied.

Mr. RICHARDS was proceeding to call other witnesses, but the court said it would be useless to call them after such evidence as had been given.

Mr. BURKE said the Act of Parliament had already provided for the dividend which the company were to receive.

Mr. HASSARD: The maximum dividend.

Mr. BURKE had been reminded that the price charged had, under the circumstances, been too low.

Mr. HASSARD: According to the evidence that has been given you may manufacture gas at 1s. 8d. per 1000 feet.

Mr. BURKE: But you have interest to pay on your capital.

Mr. HASSARD: Interest on capital is a dividend.

Mr. BURKE: Practical security to the public arises when the full dividend is obtained, for then the price must be reduced. The accounts of the company showed the profits they had made from year to year, and it was unquestionably and distinctly shown that they had not made an overcharge to the public. Their accounts were open to any of the consumers, who might if they choose, have an accountant to examine them. He contended that the company had acted *bonâ fide* and fairly to the public.

Mr. HASSARD said one of the questions to be decided was, whether the company had done all that a provident well-conducted company could have done. Might they not assume that gas could be supplied to the consumers meter at 1s. 8d. per 1000 feet?

Mr. BURKE: Certainly that was the evidence of an individual on the one side.

Mr. HASSARD: You have given us no evidence as to cost of production.

Mr. BURKE: Our case is not yet concluded; we propose doing so.

Witness: The cost of production mentioned is at the works and not into the consumer's meter. It does not include the interest and dividends upon the cost of the mains.

Mr. HASSARD: The cost of buying the mains is capital.

Witness: The cost is the cost at the works.

Mr. HASSARD: In the case of Uxbridge, it was said that the contractors delivered the gas into the consumer's meter at 2s. 6d. per 1000 feet.

Witness: The company finding the mains, retorts, and everything else, and paying the rates, taxes, and cost of collecting.

Mr. HASSARD: Yes; the dividend being upon the capital.

Mr. BURKE: I know a place where the price charged is now 5s. 6d. per 1000 feet, and the company pay only 7½ per cent. dividend.

Mr. HASSARD: They paying upon a certain capital would not show that the capital was expended in the works.

Mr. BURKE would take the case of a corporation supplying a town. Was it not a fact that in Rochdale, where the gas-works were managed by the corporation, the gas was sold at 4s. or 4s. 6d. at the outside, though they had coal at 7s. per ton in that neighbourhood. Was not this a fair inference that the corporation were acting for the benefit of the public, and that the price was one which could not be reduced even under such circumstances.

Mr. SMITH then addressed the referees on behalf of the local board, a portion of whom he represented. The formation of two companies in a town like Worksop would, he contended, be of great inconvenience, whilst the damage to the streets, by the laying of additional mains, would be considerable. The expense of all this would have to be met, and some of it would undoubtedly come out of the pockets of those who were not consumers, and who would have to pay increased rates in consequence. The Local Board of Health were the guardians of the public property, and they simply asked the committee to bear in mind the size of the place, the straggling nature of it, and they said the inconvenience would outweigh the convenience in most respects. The court would also be pleased to bear in mind that, in other towns where combination after competition had taken place, the prices charged to the public were higher than they had been before.

Mr. WILKINSON, on behalf of the promoters, said it did appear to him that they, on their part, had established a stronger case than the existing company had against them. Without going into particulars, which were detailed in evidence, he would say that the result showed that the town at present was supplied by a company who had no peculiar claim to supply a town which was flourishing in every way. It was evident the existing company had expended large sums of money upon their works, but the items which had been stated did not seem to include the first outlay which had been so improvidently made. The fair criterion would be to take the cost of erecting works which were sufficient to supply the town. The only evidence upon that point was that of Mr. Barlow, who said that the cost of erecting works was £1000 where they could manufacture a million feet of gas. Against the experience of Mr. Barlow he would place that of other persons, who had said that £500 would be sufficient to erect works giving that supply; of course, all would depend upon the cost of production, the consumption, and the population. The existing company had proposed to reduce the price of their gas; on the contrary, the new company came with the most perfect protection to the public in clauses which had been carefully considered by the Board of Health, and a strong expression of feeling and a desire on the part of the inhabitants generally that they should establish themselves in the town. The new company would start with a large number of consumers; out of 490 they would supply 250. As to the objection which had been raised, that competition mostly ended in combination, he would say that his clients apprehended no such result. They said that the price they had laid down would be quite sufficient, and that the lighting of the public lamps should be under the regulation of the Board of Health. I hold it would be hard to say that combination under such circumstances would arise hereafter.

The COURT: Would the opponents undertake to reduce the price of gas to 4s. per 1000 feet?

Mr. RICHARDS: The fact is, we could not live at that price.

Mr. HASSARD: If you only sold 8 million feet of gas, it would give you 8 per cent. dividend.

Mr. RICHARDS: We are doing our best to serve the public.

Mr. HASSARD: A charge of 3s. 6d. would give 8 per cent. on £9000.

Mr. RICHARDS: Will the court allow us to take a small margin upon 4s., we at the same time using every honest endeavour to reduce it gradually. The amount of two years dividend, it must be remembered, will be gone in expenses in exposing the new bill. May I hand to the court a figure which we are willing to adopt, and which we believe to be the lowest price we can with safety adopt?

Mr. WILKINSON: Will my friend show it to me? I must object unless he does so.

Mr. HASSARD: I find that 4s. will give 8 per cent. on more than £11,000. We only ask the petitioners to propose a figure; we do not press anything upon them. Whatever you propose, we may not bind you to.

Mr. RICHARDS: As it has come from your side of the table, I will take upon myself to propose 4s.; but if we find ourselves placed in competition with another company, of course this could not be abided by.

Mr. WILKINSON: If it should be the opinion of the court that 4s. should be the maximum, the court would of course give his clients and the public the protection of proper clauses. It was most desirable that the dispute between the company and the Board of Health should be put an to by the adjustment of the clauses. As the proposition, if adopted, would result in our not obtaining the bill, I think the promoters should be reimbursed their expenses of coming here.

Mr. RICHARDS: I apprehend the court have no power to do anything with the clauses between the company and the local board.

Mr. HASSARD: No; we can carry nothing out with respect to them.

Mr. RICHARDS: As to reimbursing the promoters, of course, nothing could be said till the court had reported that the preamble of the bill was not proved. It was a matter which would have to be most carefully considered.

The COURT: Of course the bill ought not to be proceeded with after the undertaking that the company would reduce the price of their gas to 4s. per 1000 feet.

Mr. RICHARDS: Will you name the date at which the reduction should take place?

The COURT: The 1st of January.

Mr. WILKINSON then applied for expenses, observing that if it had not been for the state of things between the company and the inhabitants of the town, the new company would not have been started, and consequently the expense of coming to Parliament not incurred. The refusal to reduce the price rendered their coming to Parliament necessary.

The COURT could not see how costs could be allowed under the circumstances, and all parties then withdrew.

SATURDAY, MAY 12.

The referees reported as follows:—"The referees report that the quality of the gas supplied by the existing company is sufficiently good, the illuminating power being equal to that required by their Act, and that the supply is also sufficient; and the referees are of opinion that this bill ought not to be proceeded with, the opponents undertaking to reduce the price of gas to 4s. per 1000 feet from the 1st of January next.—J. H. SCOURFIELD, Chairman."

Legal Intelligence.

COURT OF BANKRUPTCY.

WEDNESDAY, JUNE 13.

(*Before Registrar* BROUGHAM.)

Re TOM ABERCROMBIE HEDLEY.

The bankrupt was described as of No. 28, Poultry, in the City of London, and of Kingswood Lodge, Mortimer Road, St. John's Wood, in the county of Middlesex, civil engineer, in co-partnership with Davis Wilson Rea, of No. 28, Poultry, in the City of London, contractor. The debts amount to about £1600, and amongst the creditors are J. Olney, Borough, £250; Tatham and Rye, Banbury, £250; T. A. Tibbitts, Gray's Inn, £200; W. Sarl, Lombard House, £150; J. Coyte, Lincoln's Inn Fields, £123; W. Strode, St. Martin's-le-Grand, £105; Walter Ford, Gray's Inn Road, £105; Pearson, Warwick, £83 10s. 9d.; G. Anderson, London, £75; J. S. Forbes, Hanley, £50; the rest being principally tradesmen at St. John's Wood and Banbury. The bankrupt appeared on his own petition, and attributes his failure to "law costs and non-payment of accounts." This was the first sitting, for proof of debts and choice of assignee.

Mr. GEORGE, solicitor, of Size Lane, appeared for the bankrupt; Mr. MURPHY, barrister, instructed by Messrs. Vallance and Vallance, for Mr. Wallington, the clerk to the local board of Leamington, an opposing creditor.

Mr. Wallington tendered a proof for £165 9s. 4d., on account of costs incurred in defending an action brought against him by the bankrupt.

Mr. GEORGE objected to the proof being received. He said the debt was incurred by Mr. Wallington as clerk to the local board of Leamington, in an action in which he obtained judgment. But in relation to that action there was now pending an indictment for perjury against the deponent, upon which a true bill had been found. It might be that in the result there would be no authority shown to incur the debt, or that the deponent was not the right person to prefer the claim. He therefore asked that the matter might be adjourned. The proof was founded upon a certificate of the Master that he was entitled to the costs of the action brought against him by the bankrupt for professional charges in attending before a committee of the House of Lords and giving evidence. The deponent paid £45 into court, and there was a reference to the Master to determine whether that £45 was a sufficient sum for the services rendered. The Master took the evidence of the deponent as clerk to the board on whose behalf the bankrupt had been engaged, and the result was a judgment adverse to his claim for additional remuneration. Immediately afterwards, the bankrupt indicted the deponent, who appeared before the magistrate at Bow Street, charged with perjury in the evidence which he gave upon the reference. The hearing of the case occupied two days, and the deponent was committed for trial, and a true bill was found against him at the last Old Bailey session. An application had since been made and granted to remove the case upon a *certiorari* into the Court of Queen's Bench, where it now stood for trial. The statement of the bankrupt was that in consequence of Mr. Wallington's evidence upon the reference he had lost his claim and that amount of costs. He (Mr. George) contended, first, that the deponent was not the proper person to tender the proof—it must be done by the local board; and secondly, that if he were entitled to prove, the matter must be adjourned until the indictment for perjury had been disposed of.

The REGISTRAR: What has the indictment for perjury to do with it?

Mr. GEORGE: Just this. The action was for certain services performed.

The REGISTRAR: You have told me that. But what has the indictment for perjury to do with the proof?

Mr. GEORGE: The indictment is for perjury, and the bankrupt says that, in consequence of the deponent's evidence, the certificate of the master was against him.

The REGISTRAR: Supposing you are successful in your indictment for perjury, what effect would that have upon the judgment?

Mr. GEORGE: Then we should be in a position to apply to the court to set aside the award.

Mr. MURPHY: An application has been already made to the Court of Exchequer, and dismissed with costs.

Mr. GEORGE: Certainly, under the circumstances, if the object was to obtain the appointment for assignee——

The REGISTRAR: We have not come to that point yet. Let us deal with one thing at a time.

Mr. GEORGE: Then I submit that this is a peculiar case. The bankrupt states that the judgment was obtained against him upon the false evidence of the deponent, that he has indicted him for perjury, and that while that indictment is still pending the proof ought not to be allowed.

The REGISTRAR: But here is a rule to set aside your rule.

Mr. GEORGE: That is still pending. The court pending the indictment would not interfere.

Mr. MURPHY: The application to set aside the award of the Master was dismissed with costs.

Mr. GEORGE: Because at the time the application was made there was no sentence against the deponent.

The REGISTRAR: In the meantime I must admit the proof. The deponent is clearly the right person as the judgment is recovered. He is the clerk to the Local Board of Health, and the judgment is in his name personally. The action was brought against him personally, and I think this must be admitted as a proof.

Mr. GEORGE: Then I must ask you to adjourn it.

The REGISTRAR: I cannot admit and adjourn. It is admitted as a proof.

Mr. GEORGE: Will you take a note of the objections made upon it, because this is a very peculiar case?

The REGISTRAR: A note—what for? I have heard your objection and overruled it, and have admitted the proof.

Mr. GEORGE: Then, of course, I cannot carry it further. I only want a note of the objection to appear upon the proof.

The REGISTRAR: Of course, at any time hereafter you can apply to expunge the proof if any necessity arises.

Mr. GEORGE: Will you make a note in your book of the request, so that hereafter if we have occasion to refer to it when the indictment is tried we can do so and apply to the court again?

The REGISTRAR: I will make a note that you object to the proof; in fact you may have a memorandum on the proof that you objected to the admission on such and such a ground.

Mr. GEORGE: On the ground that an indictment for perjury is still pending.

The REGISTRAR: Draw up your memorandum on a separate sheet of paper that I may see it before it is done. On the other side I must also have a statement in support of the proof.

During the time the memorandum was preparing,

The REGISTRAR, who had been looking over the list of creditors filed by the bankrupt, said, addressing Mr. George: I see that the bankrupt has sworn to the debt itself.

Mr. GEORGE: He has put it in his schedule as a liability.

The REGISTRAR: He has put it in without any qualification whatever, simply as a debt of £150. If he had intended to dispute it he should have said so.

Mr. GEORGE: There was a claim against him at that time existing.

The REGISTRAR: He has sworn simply that he owed Mr. Wallington £150. I should not have heard you if I had seen that statement before.

Mr. VALLANCE: Perhaps, then, you will withdraw the memorandum, and let the proof stand without qualification.

The REGISTRAR: No; I shall let it stand as I have it.

Mr. VALLANCE: Perhaps you will add a memorandum that the bankrupt swore that he owed the deponent £150, which will neutralize the effect of it. There is another thing I may call your attention to, and that is, that he has returned the debt in his partnership capacity, whereas the debt was incurred on his sole responsibility. I do not know whether that will affect the matter at all.

The REGISTRAR: He does not distinguish whether they are partnership liabilities or not. Of course he will have to file a proper partnership account before his last examination, showing what are his joint and separate liabilities.

The following memorandum was then handed up by Mr. George:—

IN THE COURT OF BANKRUPTCY, LONDON, JUNE 13, 1866.

In the matter of Tom Abercrombie Hedley, a Bankrupt.

Memorandum.—Mr. George, solicitor to the petitioner, objected to a proof of debt presented by Richard Archer Wallington for £165 9s. 4d., costs recovered on a judgment in the Court of Exchequer of Pleas, on the ground that a true bill of indictment for perjury against the said Richard Archer Wallington in respect of his evidence in the action referred to in the said judgment had been found and was now pending, and that the consideration of the said proof should stand adjourned until after the trial of the said indictment.

To which was added by the other side:—

Mr. Murphy appeared in support of the proof, and alleged that the indictment against the said Richard Archer Wallington had been removed to the Court of Queen's Bench, and would be tried by a special jury; that the subject matter of the proof arose in respect of costs incurred by the said Richard Archer Wallington in defending an action brought against him as clerk of the Leamington Local Board of Health by the bankrupt; that a rule *nisi* had been obtained by the bankrupt to set aside the Master's certificate, and upon argument it was dismissed with costs. Mr. Murphy therefore tendered the proof, as the trial for perjury would in no way affect the right to prove.

The REGISTRAR: I merely add, "I admit the proof," and this will go on the file.

Mr. SUTTON, seedsman, of Reading, was then appointed trade assignee.

Mr. LUCAS (for Mr. Murphy) applied to examine the bankrupt with reference to a bill of sale given by him to a solicitor named Tibbitts for a debt of £230.

The REGISTRAR said it could not be done at that late hour, as he had other appointments then due, but if the bankrupt liked to answer any questions he was at liberty do so.

The examination of the bankrupt was then adjourned to the next sitting.

Miscellaneous News.

IMPERIAL CONTINENTAL GAS ASSOCIATION.

The Ordinary Half-Yearly Meeting of the Proprietors of this Company was held on Monday, May 28th, at the London Tavern, Bishopsgate Street —BENJAMIN ATTWOOD, Esq., in the chair.

Sir MOSES MONTEFIORE said: Gentlemen, I shall ask you that Mr. Benjamin Attwood be requested to take the chair. The name of Attwood is of itself so intimately entwined around our affections, that I am sure you will be happy to accede.

The motion was agreed to.

The CHAIRMAN: As it is your pleasure, gentlemen, that I shall perform to-day the duty of chairman, upon the motion of my excellent and highly valued friend, Sir Moses Montefiore, who is president of our association, and who I am sure would not have declined to undertake the duty himself if his health had been such as to permit him to do so, I shall endeavour to discharge it to the best of my ability. Therefore, be so good as to consider me as Sir Moses Montefiore's substitute, in endeavouring to do the best I can to explain to you the circumstances under which we meet. The business we have to discuss to-day is that for which we meet here every six months, and always with great advantage. The remarks I shall have to make are very few. The business which is before you is contained in the report and accounts, which are such as I think cannot fail to be satisfactory to every shareholder in the association. There has been a very satisfactory amount of profit realized, and we know of nothing that will prevent a continuance of the same success in future. The report and accounts, when they are read, will be found to be as full as it is useful and proper for the directors, under the circumstances, to lay before you. There are matters connected with this association which are not usually found in other companies. Our operations are all in foreign countries, and we have there to contend with foreigners in their own towns. The business of gas-making which we carry on there makes them jealous of us,

particularly as being foreigners. Every word that is uttered here to-day is taken down by the gentleman opposite to me, and the proceedings here will be printed in three or four different languages and circulated all over the Continent. That is a circumstance which prohibits the directors of this company from entering so fully into explanations as they could wish to do, which does not attach to companies carrying on their business entirely in this country. It would not be prudent or judicious that every circumstance connected with this company should be printed and circulated all over the Continent, as our proceedings to-day will be. Therefore, every detail of the accounts and everything that can properly be given to the proprietors is fully set forth in the accounts and in the report; and I hope and trust that we shall be able to get through the proceedings to-day without any disagreement or unpleasant remarks being made, either by the one side or the other; that we shall carry on our proceedings harmoniously, which will certainly be more for the benefit of the association than if there were contentions and strife amongst us. Under those circumstances, I will not trouble you with any further remarks, but call upon the clerk of the board to read the advertisement convening the meeting.

Mr. S. J. Brown (the board-clerk) read the advertisement convening the meeting accordingly.

The Chairman: Gentlemen, the first business that we have to do to-day is, as required by the Act of Parliament, to affix the seal of the association to the register of shareholders. That needs no vote, because the Act of Parliament says it must be done.

The corporate seal of the association was accordingly affixed.

The Chairman: I will now call upon Mr. Pearce, our solicitor, to read the report.

Mr. W. P. Pearce (of the firm of Pearce, Phillips, and Pearce), then read the report, of which the following is a summary:—

The report stated that the general state of the affairs of the association, during the half year under consideration, had upon the whole been satisfactory.

The consumption of gas and the number of lights had continued to increase.

This continuance of progress was mainly attributable to the extensive reductions that had been made in the prices charged for the gas, aided by the great exertions which had been made in every possible manner by the able and devoted officers of the association, under the direction of their talented superintendent, Mr. G. W. Drory; and at some of the stations by a diminution in the cost of coal.

The president and directors had adhered to the general course of policy which had hitherto been adopted in the conduct of the affairs of the association, and which had been attended with so much advantage, and had produced the satisfactory result exhibited by the accounts.

In all cases where reductions in the price of gas could be reasonably called for or expected, they had been effected, and every endeavour had been used to meet the wishes of the authorities and inhabitants of the towns lighted by the association.

At Haarlem, the negotiations mentioned in the last report as then going on with the authorities of that town for a renewed contract, had not yet been brought to a satisfactory conclusion, and therefore the association still continued to supply the lighting under the terms of the existing contract, which had still about ten years to run.

At Cologne, also, it was mentioned in the last report that negotiations were then going on with the authorities of that town for a renewed contract, and that the terms offered by the association were approved of and agreed to by the burgomaster and a majority of the Town Council. The new contract had, however, not yet been definitively and officially signed by all the parties whose signatures were required to such documents, but it was expected that the completion of the matter would not be delayed.

The expectation which had been entertained that a railroad company would purchase the site of the works of the association at Marseilles for the purpose of erecting thereon a large station in that town, had not been realized. The railway company had altered their plans, and would now only take so much of the land belonging to the association as might be required for making a road across it to their new station.

It had been previously reported that the mains of the association at Frankfort had been extended into the adjacent town of Bockenheim. The consumption of gas at the latter place seemed likely to be considerable. The president and directors had now to report that they had also concluded a contract with the authorities of Roedelheim, a small but thriving town near to Frankfort-on-the-Main, for lighting that place for 25 years, on the same terms as those made with the town of Bockenheim; and it was contemplated that the association would have to erect new works in one of those towns, as the present works at Frankfort were not upon a scale sufficiently large to supply all the gas that would ultimately be required in all the three towns; the president and directors, therefore, had purchased a piece of land in Bockenheim, whereon to build such new works as soon as they should be required.

At Amsterdam, the gas-works existing in that town were purchased in the year 1833 by the late Mr. Wolverley Attwood, on behalf of the association. But in pursuance of an arrangement made by the president and directors, and confirmed by a meeting of proprietors, Mr. Wolverley Attwood retained an interest of one-fourth part of those works on his own account, and the capital and the profits had always been furnished and divided in the proportions of three-fourths to the association and one-fourth to Mr. Wolverley Attwood. This partnership was harmoniously carried on down to the time of Mr. Attwood's decease. After that event it occurred to the president and directors that as Mr. Attwood's share had now passed into other hands, and as other such changes of ownership might from time to time take place, a state of things might arise which might be exceedingly prejudicial to the interests of the association; they therefore proposed to Mr. Attwood's executor to sell his one-fourth share to the association, which he consented to do, and an arrangement had been entered into with the executor for the purchase of the same, and the whole of the establishment at Amsterdam would by this means become the property of the association.

At the other stations occupied by the association there was nothing that required any particular observations, further than to state that the workings had all been proceeding in a satisfactory manner.

The president and directors then called the attention of the shareholders to the accounts exhibiting the results of the working of the past half year, and to the scheme for a dividend and a bonus prepared in accordance with the provisions of the Act of Parliament.

It was agreeable to the president and directors to remark that the amount of profit admitted of their recommending the same dividend and bonus for the six months ending 31st of December, 1865, as were declared at the two last half-yearly meetings —viz., a dividend of £3 10s. per share and a bonus of £1 per share, and also to provide a fund which they trusted would be sufficient for the purposes of enlarging, repairing, and improving the works, as required; and likewise to meet all the numerous contingencies to which the affairs and interests of the association must be continually subjected.

Whether the view expressed on several occasions by some of the proprietors in favour of an increase of capital by capitalizing profits or otherwise were or were not correct, the shareholders would doubtless be almost unanimously of the opinion that the present would not be an opportune moment for entering upon the consideration of that question.

The large distribution of profit now recommended was entirely the result of the course of policy adopted for so many years past in the conduct of the affairs of the association, and which could have been effected by no other possible means than that of providing amply from profits, when they allowed of it, the funds requisite to extend the works, so as to render them equal to the supply of the increased demand for gas occasioned by the reductions in prices which the president and directors had found it expedient to make, and which increased demand for gas had been attended with an augmentation of profit.

To this principle, which had hitherto proved so sound, the president and directors would still adhere; and if the great apprehension of war which appeared at present to agitate all Europe should not adversely interfere with the operations of the association, there was no reason to doubt that those operations would still continue to be attended with success.

The Chairman: Gentlemen, that is the report which the directors have to submit to you to-day, and I am sure it will satisfy every one that the best endeavours of the president and directors have been continually given to promote the prosperity of the concern. If there is any explanation relative to the items in this account required by any shareholder, the president and directors will be happy to afford it so far as we are enabled to do so. I think I comprehend the affairs of the association as well as any one. I have been in it many years, and am fully acquainted with all its concerns, and if I can afford you any further explanation than is here given I shall be happy to do so, and I hope we shall part without any disagreement or dissension amongst the shareholders as sometimes has occurred at our meetings, for nothing can be more objectionable to the directors than that there should be any disagreements upon these occasions. I will move that the report which has been read be received and entered on the minutes. If any gentleman wishes to move anything upon that proposition I shall be happy to hear what he has to say.

Mr. J. W. Cater said it was satisfactory to learn that there had been an increase in the number of lights consequent upon the reduction of price charged for the gas, because it showed that they were proceeding in a most satisfactory manner. He was perfectly satisfied, from the way in which the directors carried on the business of the company, that none was freer from debt. Such were the advantages which they derived from having such a board, and he wished he could compliment them as much upon their desire to distribute amongst the shareholders a larger proportion of profits. He should like to see the 28,000 shares of the association increased to 42,000 shares with £50 paid, so that every proprietor might have a certificate representing the true value of his property. He was quite adverse to any kind of hostile dealing with such a board of directors as they had; but he was one who had made his way in life, and therefore desired to speak his opinion boldly and fearlessly. He would move—"That the large sum at the credit of profit and loss of net revenue derived from the working of this company fully warrants the increase of the number of shares from 28,000 with £43 15s. paid to 42,000 with £50 paid, and that the shares and capital be so increased, allotting to each proprietor one such share for every two shares held by such proprietor, thus enlarging the capital of the association from £1,225,000 to £2,100,000 fully paid up."

The Chairman said the resolution could not be put, as it was illegal.

Mr. Michael said he represented a large number of shareholders, and he desired it to be understood that he had not a word to say against the general conduct of the affairs of the association by the directors; in fact, he tendered them his sincerest thanks for their successful working of the association, which was beyond all praise. However, he did not consider it any disrespect, holding as he did some views upon one point, to come there time after time and put those views before the meeting. It had been said that his views had been brought forward before, and that they were only supported by a small number. If they were right they would conquer in the end, however often they might be defeated, and however few supported them at the present time. He did not think it was right to put by annually so large a sum, to be substracted from the pockets of shareholders *in esse* for the benefit of some *in posse*. He thought it was a good principle in conducting gas companies, that whenever profit accrued it should be divided amongst the existing proprietors. He would refer to the case of *Binney v. The Ince Hall Colliery Company*, which had been lately decided by one of the vice-chancellors, which seemed to show that the proper principle to act upon would be to have the works valued half-yearly, and to put aside so much out of the profits to form a reserve-fund as would cover the depreciation; and if that were done, there would remain a large amount to be distributed in dividend. There seemed to be some doubt as to whether profits could be capitalized, and he suggested, as he had proposed before, that the association should go to Parliament for the purpose of having that doubt solved.

Mr. J. W. Cater inquired whether it was necessary to go to Parliament to enlarge the capital of the association.

The Chairman: It may be enlarged to the extent of 2000 shares and no more under the present Act. If no other gentleman has anything further to add, I have a few remarks to make in answer to what has been said. First, with respect to the gentleman on my right (Mr. Cater), I cannot entertain his resolution because it is contrary to the law, and could not be put to the vote. Therefore, in answering his observations I should only be taking up your time unnecessarily. With regard to what has fallen from Mr. Michael, he makes no allowance for the depreciation of your property. The practice allowed by Act of Parliament in regard to English companies is regularly to deduct 2 per cent. for depreciation. It has not been expedient in this company to write off that depreciation, because we are not as companies are in England, holding our own freehold against everybody, but subject to periodical concessions, and when they expire our works may be taken away from us, as we state in our report. It is not expedient to put that before people who are to take our works *vi et armis*. Look at the state of affairs in Marseilles. They have taken the concession away, and the works of the association there are now good for little or nothing. If we were to issue certificates representing our property, without reference to depreciation, they would be incorrect, as they would not truly represent the facts of the case. Then it is said, "Why not issue all these additional shares?" *Cui bono?* The object of the association is to get dividend, and dividend comes out of profit, and profit is made by making gas and not by making shares. You might make shares *ad infinitum*, but you would not thereby have more money to distribute. It has been said in this room that on one occasion the association did increase its shares very largely. We did create 6000 shares, and distributed them amongst the shareholders rateably, but what was the effect? The shareholders on that occasion did not get one penny more dividend than they got before. The very next half year, when they came to get their dividend they took away precisely the same amount as they got before, and not one penny increase, and the price of the shares in the market was thereby at that time depreciated instead of enhanced. There were four capitals, and they were amalgamated into one. The dividend on the fourth capital had been £4 15s. per share, and it then went down to £3 10s., and the shares which had been currently selling at £75 and £76 went down at once to £47 and £48. The shareholders derived neither benefit nor loss from the increase of 6000 new shares. Upon that occasion the president and directors thought it right to communicate with the committee of the Stock Exchange and inform them of the altered value of the shares of the association, so that any shareholder might not run into the market and say, "Here is a share paying a dividend of £4 15s., what will you give me for it?" when, in fact, the dividend would be only £3 10s.; and the committee of the Stock Exchange were very much obliged to the directors for giving them that information, so that no person could take advantage of the altered value of the shares. That would be the case again if we were to comply with the suggestion for an increase in the number of shares. We have got a certain amount of money to be divided, and we cannot increase that by making shares. The shareholders in this company may rest perfectly assured that there can be

no need of a stimulant to the board of directors to increase the dividend as soon as they have the means to do it. Some gentlemen may believe that we do not care for the interests of the shareholders, but it is impossible for them to believe that we do not care for ourselves, seeing that the number of shares held by the directors in this association is, I believe, greater than in any other company in this metropolis, and you may be assured that if an increased dividend could be got nobody would be more rejoiced to get it than the directors; therefore you may depend upon it that when the time comes that we can safely make a larger distribution no one will rejoice more than the directors themselves. The shareholders may be confident that we are doing our very utmost to promote their interests as well as our own, and we shall continue to do so, I hope, to the satisfaction of every one who participates in the success of the association.

The resolution for the adoption of the report then passed unanimously.

The CHAIRMAN: I now move—"That a dividend of £2 10s. per share and a bonus of £1 per share, making altogether £3 10s. per share on the 28,000 shares of the association, be declared for the half year ending the 31st of December last, and that the same be payable, free of income-tax, on and after the 15th of June next, as recommended in the report."

The resolution passed unanimously.

The retiring directors and auditors were unanimously re-elected.

Mr. STOKES moved, and Mr. HOLMER seconded a cordial vote of thanks to the president and directors for their able management of the affairs of the association, saying that in the shaking of the nations they stood firm, because the company had been managed in so masterly a way.

The resolution having passed *nem. dis.*,

The CHAIRMAN said: Gentlemen, on behalf of my brother directors and myself, I beg to tender you our sincere thanks for this mark of your confidence in our proceedings, and I can assure you that the utmost endeavours we can use to promote your interests will be constantly and freely applied to achieve that object.

BRITISH ASSOCIATION OF GAS MANAGERS.

THURSDAY, MAY 24.

The chair was taken this morning, at eleven o'clock, by T. G. BARLOW, Esq., V.P., who read the following paper:—

DESCRIPTION OF A SELF-REGISTERING PHOTOMETER.

The subject on which I propose to offer a few observations is the application of one of the most brilliant discoveries of the age, photography, to photometry in such a manner as to produce a permanent and accurate record of the illuminating power of the gas, either as it is delivered into the gas-holder or as it issues from the gas-works. We are indebted for the instrument by which these results are obtained to the combined labours of Mr. Kirkham, of the Imperial Gas-Works, at Fulham, and Mr. Sugg, of Westminster, who, aided by Mr. Glaisher, of the Royal Observatory, at Greenwich, have for some time been engaged in perfecting in its details the instrument I am now about to describe.

The "durability test" as it is usually called, has long been a favourite mode amongst Scotch gas engineers of determining the comparative value of coal gas, as it is well known that the length of the flame issuing from a jet of given aperture will vary according to the quality of the gas, the richer gas giving the longer flame, and the poorer gas the reverse. Dr. Fyfe, of Aberdeen, availed himself of this effect many years ago to make the earliest recorded observations on the comparative values of different gases, by determining the time during which one cubic foot of gas would supply a jet flame of a certain uniform height; and till the Bunsen photometer was perfected by Mr. Alfred King the durability test was the one most relied upon by gas engineers in making such comparisons.

Some years ago, Mr. George Lowe suggested a method of testing the illuminating power of gas by means of a jet burning from an aperture of known size and issuing under a known pressure, and he always found, by the results of a vast number of experiments extending over several years, that the jet he had employed gave the same height of flame for the same quality of gas; the pressure at the point of ignition always remaining constant at 6/10ths of an inch.

The system he pursued in conducting these experiments was this:—

1. The aperture of the jet was gauged by means of a wire exactly fitting into it.

2. The pressure at the point of ignition was regulated to 6/10ths of an inch, the pressure being shown on a King's pressure-gauge delicately balanced, each tenth being magnified to about four times its natural size.

3. The height of the flame was measured by means of a wire fixed at the back of the flame and bent over at the top, so that when the flame reached the height of six inches it just touched the wire.

By nearly simultaneous observations taken by the bar photometer upon the same gas he established the value of a 6-inch flame from the jet to represent 12 candles when the gas was consumed in an Argand burner at the rate of 5 feet per hour, and he found that when the gas rose in illuminating power to 13 candles his jet was just half an inch longer than the wire standard; and, on the other hand, if it fell to 11 candles, it was as nearly as possible half an inch shorter.

Lowe's jet photometer was subsequently modified by enclosure of the jet in a box, the substitution of a more delicate pressure-gauge, capable of showing the 100th of an inch of water, for the one he employed, and, instead of the wire, a scale at back of jet corresponding to another scale scratched on the glass serving as door fixed in front of the jet. These photometers have now got very generally known, and the theory asserted by Mr. Lowe has been found to be as nearly as possible correct in practice.

Twelve months ago the idea struck Mr. Kirkham that the indications of the photometer might be recorded throughout the hours of the day and night by means of photography, and thus be made to give as it were a chart of the illuminating value of the gas supplied to the public or made during each hour's working. Mr. Sugg associated himself with him, and the result of their united labours is the registering jet photometer now before you.

A close box, rectangular on plan, to which no light can enter when the door is closed, except through the windows, filled in with red-coloured glass, is fitted on one of its sides with a jet photometer, and on the opposite side with a photographic camera. The back of the photometer is fitted with a piece of brass, having a slit in it about an eighth of an inch wide. Crossing this slit externally, at certain intervals from bottom to top, are pieces of wire, intended to produce the lateral marks upon the registering-plate where affected by the light of the illuminating power jet. A short distance below the lowest of the wires a prism is fixed in a vertical position, in the same line with the jet. This prism is also provided with wires placed laterally across it, and their use is to produce the lateral lines upon the registering-plate on that part where the pressure at the point of ignition of the jet is recorded.

These wires are fixed at regular intervals, and the distance between each corresponds to 1/10th of an inch of pressure. The base line is at the top, in order that the distance between the jet registrations and the pressure registrations should be constant, and for convenience.

The pressure on the illuminating power jet is maintained by means of a double governor, and a very delicately balanced King's pressure-gauge is provided, through which the gas flows to the jet, so that the least variation of pressure, even to less than the 100th of an inch, is plainly perceptible. The importance of these arrangements will be immediately perceived when it is considered that the entire success of the experiment depends upon the gas being made to issue at a uniform pressure. The pressure-gauge is also provided with an apparatus for altering its water-level without opening the door of the photometer. This is simply a solid plunger closely fitting to the inside of a cylinder, the middle of which is level at the true water-line of the pressure-gauge. Above the plunger is fixed a screw, which either raises or depresses the plunger, and produces a contrary action on the water-line of the pressure-gauge, so that the pointer can be brought to the zero point with speed and accuracy. If it were necessary always to open the door to do this, the sensitive plate might be spoiled by the action of daylight or strong gaslight.

The jet, having been turned on, lighted, and adjusted to its proper pressure, shines through the aperture at its back, so that its image is clearly reflected through the lens on to the registering-plate, the lateral wires showing its height.

These indications would, however, be quite useless unless it was certain that the pressure had been maintained at its proper standard, and to give this information the prism before spoken of is employed.

A light adjusted by means of a double governor, similar to the one employed for regulating the pressure on the jet, is made to burn in such a position that its rays may fall upon the side of the prism, and, by refraction, pass through it, throwing its rays on to the lens of the camera, by which it is in turn transmitted to the sensitive plate.

In order to show what pressure is indicated by the pointer on the dial of the pressure-gauge, the following means are made use of:—

On to the shaft which carries the pointer is fixed a small grooved wheel, exactly corresponding in diameter to another and similarly grooved wheel, fixed about 4 inches above and perpendicular to it, so that a light silk line may run over them both. This line, being attached to one part of the periphery of the lower wheel, is made to pass over the upper one, and its remaining end is tied on to a small weight; thus the motion of the lower wheel is exactly imitated by the upper one, and this upper one, being provided with a cycloid fixed to its shaft, it follows that any portion of a revolution of the main-shaft of the pressure-gauge may be made to cut off the light shining through the prism to any degree, according to the rising or falling of water in the pressure-gauge cistern.

When the gas is shut off from the pressure-gauge, and the pointer falls to zero, the cycloid cuts off all the rays passing through the prism except a thin line which is the base-line shown on the plate. Any alteration in the the thickness of this line will show whether the pointer was above or below zero, and exactly how much to the 100th of an inch, and when the jet is lighted how much pressure is on it, for there will be as many spaces as there are 10ths of pressure shown on the gauge. In order, then, to get a satisfactory plate, the photometer-jet should not be lighted for one hour at starting, so as to give the pressure-jet an opportunity of recording its base-line; and the photometer-jet should be turned out on the 23rd hour—*i. e.*, eleven o'clock—to show that the water-line of the pressure-gauge has not been interfered with, or if from any cause whatever it has varied, then to what extent. The adjustment of the cycloid can easily be made when the photometer-jet is turned off by means of the small mirror fixed in front of the pressure-gauge opposite the zero line.

At such a distance from the back of the jet photometer as will be sufficient to produce the image of the jet and pressure-gauge quarter full size upon the sensitive plate is fixed a No. 3 Ross's lens, with arrangements to enable it to work with a small actinid power, because although the image it has to reproduce is shining directly on to the lens, yet the actinid power in the gas-flame is so small that without such a lens the rays would not have time to affect the silver on the plate sufficiently to make a good negative during the time occupied by the plate in traversing the point where the image falls.

Within the focus of this lens is laid down a brass rail, and upon that the slide containing the sensitive plate is made to roll by means of a small lever clock fixed immediately above the slide, and gearing with it by means of a rack on the slide and a toothed wheel on the clock. A simple arrangement of a lever with a roller on it working into a groove cut in the top of the slide serves to connect it with the clock and keep it in its place. From the top to bottom of this slide are stretched wires which divide the plate into 24 hours, and as each of these pass across the point where the images of the jet and pressure-gauge fall on the plate, it leaves its shadow-mark on the plate, producing the vertical lines, which are hours.

Between the jet and the pressure-gauge on the photometer-side will be seen a small prism illuminated by the rays of the pressure-jet, and the image of this prism falls on the sensitive plate between the base-line of the photometer-jet and the base-line of the pressure-gauge. The office of this prism is to illuminate the stencilling-plate carrying the numbers of the hours and the date of the month and year during which the record is made.

The plates made use of for obtaining the information required are those known as Dr. Hill Norris's dry stereoscopic plates, and they are prepared in the following manner:—A clean glass plate is coated with ordinary iodized collodion, and immersed in a bath of nitrate of silver. After remaining some minutes in the bath, in order to allow the silver in the bath to form the iodide of silver upon the glass plate, by combining chemically with the iodine contained in the collodion, it is withdrawn, and washed upon its surface with a small quantity of distilled water, in order to remove any free nitrate of silver which may be floating about on it. After standing for a short time to drain, it is coated with gelatine, so as to secure the iodide of silver, and prevent dust getting to the collodion film.

These plates, when dry, are sensitive to the action of light, and must be packed away in a dark place, or in a place where no light can fall upon them except through the medium of a red glass, through which the actinid power of light will not pass at all.

Now, although the collodion film while wet would be readily affected by the rays of a candle even, yet when prepared for dry plates it is not possible to make them retain their sensitiveness to such an extent, and therefore it is that a lens is required whose chemical power shall be as great as possible, so as to act upon the plate in the shortest possible time.

The process of developing the plates after their exposure is as follows:—When taken from the slide no mark is perceptible upon the plate, because although the silver contained in the film is changed in its nature by the action of the light, yet the effect of this change will only be apparent when it is brought into connexion with some organic substance which shall in

combining with it change its colour, at the same time leaving without change that portion of silver not touched by light.

The substance most easily and inexpensively employed for this purpose is gallic acid, of which a solution is made by simply filling a bottle with distilled water and throwing into it some gallic acid till the water is saturated, ensuring always that it is so by taking care that some grains remain at the bottom of the bottle.

To make this solution with cold distilled water it is requisite that the water should remain in contact with the acid at least 24 hours. Two ounces fluid of this solution is poured into a glass dish, and to it is added 15 drops of a solution of nitrate of silver—20 grains silver to one ounce of water. Into this, the plate after being taken from the slide is immersed, care being taken that the immersion be done so that the solution contained in the dish flows over the plate immediately, without leaving any dry places.

After about a quarter of an hour the image will be seen upon the plate, or, in photographic language, "the image will develop itself in all its details under the influence of the developer." It will only then be necessary to increase the intensity, or, in ordinary words, to make the image blacker, by adding about 15 to 20 drops of the same solution of silver to the developing solution in the tray; about a quarter of an hour or 20 minutes will be quite sufficient, and if it is not required to print from, the plate may be washed with a little water and allowed to dry.

To use the plate for copying, it is first necessary to remove the iodide of silver which has been unaffected, and this is done by immersing the plate in a bath of hyposulphite of soda or cyanide of potassium, both of which will remove the iodide not touched by the light, without in the least injuring the picture. The plate should then be varnished to protect it from injury, and this is done simply by pouring a little prepared varnish on to the glass so as to cover it, and letting it run off into the bottle again.

The paper for printing upon is that known as "papier Saxe," and is prepared somewhat in the following manner. A piece of paper is floated on a solution of chloride of barium, and afterwards upon a solution composed of distilled water and white of egg, which gives it a glazed appearance.

Prepared in this way, it is to be obtained of any photographic chemist, and in this form it is quite insensitive to the action of light, and to prepare it for printing it is only necessary to float it on a bath of nitrate of silver solution containing about 60 to 80 grains of nitrate of silver to one ounce of distilled water, and hang it up by one corner in a dark room or box till it is dry. When dry it is laid on the negative with the prepared side of the paper facing and touching the face of the negative. Both are then put in a printing-frame, and exposed to the action of daylight or sunlight till the edges of the paper become quite bronzed. Then the paper is removed, and after being well washed with common water to remove any untouched silver which is soluble, leaving behind on the paper that portion of silver upon which the light has shone which has become insoluble, it is immersed in a bath of distilled water containing a small portion of chloride of gold, which has the property of giving a tone of either deep chocolate brown or black, according to the quantity of the gold employed and the time during which it has been allowed to remain in the bath. It is then taken from this bath and immersed in a bath of hyposulphite of soda till the paper appears clear upon holding up to the light, after which it is thrown into hot water and allowed to remain till all the hyposulphite has been dissolved out of it and thoroughly removed. Should any remain it will crystallize upon the paper and finally destroy the picture.

This process, although when described at length appearing complicated, is in reality extremely simple, and such as may be performed by any ordinary person perfectly with a few hours practice.

In the development of the plate it will in practice, however, only be necessary to immerse the plate in the developing bath and allow it to remain shut up in the box till it is done; no harm would result if it were left all day in this bath.

It is of course large establishments only that can avail themselves of such instruments, the chief practical value of which is to disprove by unquestionable evidence the statements of trading agitators who habitually misrepresent, or unskilfully conduct experiments on the illuminating power of gas, and who obtain some credit because the details of no concurrent counter-experiments can be produced to contradict theirs. In such establishments photographic photometers must henceforward be as necessary as pressure registers.

Mr. Owst-Atkinson said the association were much indebted to the vice-president for his interesting paper, and he hoped the members would soon have the opportunity of seeing it in print.

Mr. Irons said the writer mentioned that the idea of the application of photography to photometry occurred for the first time to Mr. Kirkham, about twelve months ago. The idea, however, was not so recent as that, for the Astronomer-Royal, fifteen years ago, had an apparatus at the Royal Observatory, by which the state of the clouds was registered, and transferred to paper by means of gas. That gave one indication of the mode of examining the illuminating power of gas by photography. Another indication might be obtained by ascertaining the amount of shadow which the gas cast. The way in which this matter occurred to him was this: the Astronomer-Royal made a complaint of the gas supplied to him. Previous to using the gas it was naphthalized, and he (Mr. Irons) believed the complaint was due to the want of care in that process. The Astronomer-Royal told him that he could always tell, by the depth of shadow which the clouds threw upon the prepared paper, the quality of the gas supplied to him.

The Chairman said he was quite aware of what was done at the Greenwich Observatory some years ago, and that induced him to mention Mr. Glaisher's name. He knew also that Mr. Glaisher materially assisted Mr. Sugg and Mr. Kirkham in the development of this system.

Mr. Anderson was sorry to say the remarks of Mr. Irons proved that "there is nothing new under the sun." While he gave great credit to Mr. Sugg, whose name stood very high as a manufacturer of gas-testing apparatus, he was aware that the idea of getting photographic indications of the quality of gas was by no means of modern date. Ten or twelve years ago, Dr. Leeson used to test the gas of the Great Central Company in that way. He took a given consumption of gas—say 5 feet per hour—of perhaps 12-candle illuminating power, and by its means threw across the horizontal bars of the photometer a certain shadow on sensitive paper. If the illuminating power of the gas increased, the flame lengthened, and altered the angle of the shadow on the paper. He had a revolving drum, actuated by clock-work, which indicated the period during which the experiment was continued.

Mr. Sugg asked permission to make a few remarks with the view of putting the matter in a clearer light. When he and Mr. Kirkham commenced the construction of the photographic photometer they were perfectly aware of what had been done at Greenwich and other places. At the Observatory, Mr. Glaisher had explained to them what he had done in the use of gas for photographing. But that system and the one now brought before the association were totally different. The object of the plan adopted at Greenwich was simply to get a registration of the variations of the magnet, and that was done by attaching a lens to the bottom of the magnet, and the image of the gaslight, travelling as the magnet varied, left a mark upon the prepared paper. Mr. Glaisher was able by his mode to get an intense or a light mark upon the paper, as the gas was either of a good or inferior quality, and the paper was either well prepared or otherwise. If sensitive paper were used for registering the illuminating power of the gas, and the illuminating power were indicated simply by the mark upon the paper being intense or light, everything would depend upon the preparation and development of the paper. Such a medium as paper for the purpose required by gas testers would be perfectly useless. It was necessary to have a plate prepared in the way described by Mr. Barlow, and to register the height of the flame at the pressure at which the gas was burned. Now, according to the theory of Mr. Lowe, which seemed to work out very correctly, if the pressure were maintained at a fixed point, the height of the flame would only vary according to the illuminating power of the gas. The idea of Mr. Kirkham and himself was to register the height of this flame and the pressure under which the gas was burned. If they could secure that information they would be able to tell the illuminating power of the gas during the whole twenty-four hours of the day. That was the theory upon which the photometer now exhibited was constructed, and not the theory of judging the quality from the intensity of the shadow, because the latter would depend entirely upon the preparation of the paper, and it was impossible to prepare it perfectly uniform. Even the same sheet of paper would vary in its sensitive quality from atmospheric changes or differences of manipulation, and therefore the depth of shadow could not be relied upon for giving a fair indication of the illuminating power of the gas. He had found it necessary to abandon the idea of using a drum in the apparatus, for this reason, that at one point only of its revolution—and that a very narrow line—would it be in focus; the remainder was quite out of focus according to the size of the circle, and though an image would be obtained it would be blurred. By the present plan it was perfectly clear and sharp, because always in a true line with the lens which registered the illuminating power of the gas. He thought they would be able to make the plate register its own hours as printed upon the dial, by the same operation and at the same time as it registered the illuminating power and pressure, so that the only change necessary to make would be, once a month, to alter the name of the month, in order to have a continuous self-registering apparatus. If it should be required to print from these plates, it would only be necessary to remove the iodide of silver, and use prepared paper as with an ordinary negative.

The Honorary Secretary read the following paper, prepared by Mr. Hall, of Edge Hill, Liverpool:—

ON THE LIGHTING OF RAILWAY CARRIAGES, ETC.

When I made the council of this association a promise that I would read a paper, and gave as a title, "On the Lighting of Railway Carriages with Gas, Olive Oil, and Petroleum," I had not thought of the extent of the field I thereby undertook to plough. In fact, I made the mistake most common to novices in the writing of papers—of embodying too much. I must therefore crave your indulgence while I attempt to fulfil my promise, premising that none can be more soundly convinced of the incompleteness of the paper than I myself am.

Nearly all writers on internal government have said, in effect, that "the rights of private property being considered, men have a right to travel freely over the surface of the country in which they live." I ask, "Why should they not have a right to travel freely *and comfortably* over the surface of the country in which they live?"

There can be but one opinion as to the discomfort to which railway travellers are subjected at night. The complaint is universal in these islands. This is principally owing to the absence of a good light, whereby persons may be enabled to read, and also to see their fellow-travellers. The gloom and tediousness of a long night journey often hang about one for the whole of the following day, and I hope none of the members can speak feelingly as to the truth of my statement. The remedy for this should be provided by gas engineers.

The olive oil-lamps now in use are obviously defective, and do *not* provide what is required by the public; yet the difficulties (as we at present see matters) to be surmounted before gas or some substitute for olive oil can be made available for the purpose of lighting railway carriages are *numerous*, and this for various reasons.

Railway companies *look* for (and I think *justly* so), in any substitute proposed, the following (amongst other) advantages:—

1. That the light should be better.
2. That it should not be more costly.
3. That the apparatus should not take up any at present *paying* space.
4. That the system should be capable of application to carriages now in use.
5. That each carriage should carry its own supply, and thereby allow a train to be readily broken up.
6. That the supply of the lighting agent should last for at least 16 hours.
7. That defects, if any occur, should be easily remedied.

It is not my intention at this time to deal at any length with the question of lighting trains in its history and development. I rather propose to explain the present condition and arrangements or apparatus for lighting railway carriages, and then to give statistics to show the relative value of the various lighting agents which may or can be used.

First of all, as to gas, as this is unquestionably the best lighting agent with which we are acquainted. The systems tried are of two kinds—to wit, high and low pressure. The former was introduced into France by M. Hugon, and Thompson did the like in this country. The system, however, does not appear to have been successful. The proposal of Hugon, Thompson, and others who advocate high pressure gas, was to place below the carriages cylinders charged with gas compressed mechanically to five or ten atmospheres, and by the use of regulators to reduce the pressure to the ordinary burning point. M. Hugon was connected with the Paris Portable Gas Company, and consequently had facilities at command for supplying compressed gas. He made several experiments on one of the French railways, but I am informed the system has not been adopted there; and in the absence of reliable information I leave you to draw the inference. In 1858 Thompson completed his plan for lighting railway carriages with compressed gas. At the principal stations he proposed that railway companies should manufacture their own gas, and that they should employ a steam-engine and pumps for the purpose of pumping the gas into a stationary supply-cylinder or gasholder. This would always be ready with a pressure of, say, five to ten atmospheres, and therefrom, as required, the carriage holders could be readily supplied. By the use of what he called a self-regulating pressure apparatus, he essayed to reduce the high pressure to a constant ordinary burning pressure. (See drawing C.)

Experiments were made with Thompson's apparatus, in 1858, on the Dublin and Kingstown Railway, to test the practicability of his scheme, but the system was not adopted. I think it is clear that portable gas in this shape is anything but satisfactory. Assuredly it would have been adopted by railway companies in this and other countries if its advantages had been real. There can be no doubt that the principal objection arises from the cost of carrying out the arrangements. 1. There is the expense of plant, and the keeping of the same at work. To compress, say, to 10 atmospheres would require several pumps, the one delivering into the other. 2. The apparatus must be repeated at many places on an extensive line of railway. 3. The apparatus itself is expensive. 4. The proposed regulator of pressure consisted partly of *flexible* material, and it is well known to gas engineers that *no* flexible material is gas tight at even *street* pressures. 5. There is no complete metal regulator for high-pressure gas, so far as I am aware. 6. Passengers would object to travel in carriages where gas was carried at high pressure.

The other system used is low pressure gas. This is done one may say (regard being had to the extent of the railroad system of the country) on a very limited scale indeed. First of all, permit me to call your attention to "Newall's Patent Apparatus" (represented on drawing A). A short time ago one of the largest railway companies in this country (and one of those always ready to adopt improvements calculated to give increased comfort to their passengers), had a service of trains running a journey each way of 264 miles, fitted for gas on Newall's principle. At London and several other stations at which these trains stopped, cylinders or holders were fixed, for the purpose of supplying the gasholders enclosed in one of the compartments of one of the carriages. (See drawing B.) The cylinder A was first filled with water, then discharged, and at the same time the gas was allowed to rush in to fill up the vacuum formed by the receding water. When nearly emptied (as ascertained by means of a glass gauge, E, affixed to the cylinder), the gas-valve was closed, and the valve B connected with the water-main again opened. The work of compression then commenced, by pressure more or less according to the head of water, and which was ascertained by an indicator placed on the top of the cylinder. The apparatus was then ready for charging. The holders were supplied by opening one of the taps attached to the cylinder, which allowed the gas to pass into mains laid in different positions on the platform or underneath the lines, to which were affixed various valve-boxes, so that flexible tubes could be connected to convey the gas to the holder or holders in the train. In each train there were placed 24 burners, and two holders capable of holding collectively 380 cubic feet of gas. The sides of these were made of india-rubber cloth, collapsable or inflatable like bellows. The carriage containing the holders was placed at the rear of the train; the different carriages were then attached in the ordinary way, the gas-conveying apparatus between the carriages being formed of flexible india-rubber pipes. Near each light on the roof of the carriages there was placed a small gas-reservoir, E, about 1 foot square and 3 inches in depth, to prevent the supply of gas from being suddenly cut off from the burner and the lights extinguished by oscillation. In the guard's van there was placed a main tap and a small by-pass to regulate the supply of gas from the holders to the burners.

There are matters connected with, and objections to this system, to which I respectfully direct your attention.

1. At each station where a supply of gas was taken in, a meter was put down in connexion with the filling apparatus. It was found that, unless very great care was exercised in charging the cylinder—that is, if the gas was quickly abstracted from the gas company's mains during the time the water was receding from A—the meter got out of action. In one case it collapsed. It was also found that the lights on the station, and houses adjacent, flickered, and could not be depended upon for continuing light.

2. A high pressure of water to compress the gas was indispensable, so that, when the trains arrived at the stations, the holders could be rapidly filled, and no delay take place. It was soon discovered that this could not be obtained at any of the stations, and consequently the trains were delayed or thrown into darkness. It was also found that, owing to the limited quantity of gas carried, the trains frequently arrived at the supply stations in total darkness, having been detained by unforeseen circumstances on the journey. Indeed, after a short trial it was manifest it was impossible to accomplish perfectly the desired object with this system of lighting.

Failures so frequently occurred from the causes mentioned, and the impossibility of breaking up or separating a train without extinguishing the light in a portion of it, and from the leakage through the flexible material (which was perhaps the greatest objection) as well as from the cost of water which in some places was nearly as much as that of the gas itself (for it will be observed as much water as gas was used) as to render it impossible that the system could be continued.

The lighting of what are known as local trains, *i. e.*, those which run short stages and are not broken up or disconnected, is worthy of consideration.

The mode adopted on several railways in this country is similar to Newall's just described, but the gas is supplied to the holders at the pressure delivered from the gas company's mains; this I have found to vary, as day pressure, from 6 to 13-10ths, and the time generally taken to charge a flexible holder, capable of containing 125 cubic feet, is about 35 minutes at the pressures named. This process is slow, and consequently very objectionable, as trains have to remain a considerable length of time at the filling stations. It also frequently occurs that local trains working from station to station can only remain a few minutes at one place, and in such cases there is not sufficient time to take in a supply of gas at the pressure mentioned.

The flexible bags in this system are the same as Newall's; indeed, they are ordinary flexible bags, and the pipes therefrom to the burners are of the usual kind. So much, then, for the low-pressure system, which has had a partial success in this country.

Although the lighting of trains by gas has so far been comparatively a failure, I have the honour to submit to your notice the apparatus or system of Mr. J. T. King, of Liverpool, a gentleman who has given considerable attention to the subject. It is shown in modification by drawing. Here each carriage carries its own supply for, say, 16 hours. It is modified for local trains as in drawing D. King's system is low pressure. It is proposed that at only two or three stations gasholders should be fitted up, to which a pressure of 3 or 4 inches of a column of water could be given from time to time. Each carriage carries its own holder, placed under the body of the carriage and above the lower part of the axles. The holder is divided in two by the diaphragm B. The gas is contained under the diaphragm and supplied from time to time from the holders, as required. The diaphragm B is of such weight that proper pressure is given to supply the burners, and as only a small quantity of air is allowed to enter over the diaphragm, no appreciable oscillation in the lights can take place. It will be seen the gas is conveyed to the burners by the pipes G. The large area of the diaphragm allows gas at ordinary pressures to fill the apparatus quickly. But for the fact that Mr. King showed me his apparatus at work on a carriage, I should have been chary of speaking of it. I was, however, so well satisfied after observing the effect at a shunting junction, that I see no reason why it should not answer. Mr. King told me the other day, in answer to my question, "Why don't you carry out your gas scheme?" that he was so much occupied with professional engagements that he could not spare the time.

I have hereinbefore mentioned to you that the flexible material is the weak part of all the apparatus for carrying gas for lighting trains. You will perceive Mr. King uses only one-half the flexible material employed in Newall's or the ordinary bags, say the Metropolitan, and he effects the delivery of all the gas in the container, and thereby requires less space for his apparatus to deliver the same quantity of gas. The estimated expense of fitting up a carriage according to King's system is, I am informed—and I see no reason to doubt the statement—about £12.

So much, then, for the lighting of railway carriages with carburetted hydrogen gas. Whether King's system will in practice come up to the opinion I have formed remains to be seen. No doubt there are objections to it: first, it is bulky; second, flexible material is used. Whether these objections are inherent in any system in which gas is employed is also a matter in the womb of the future.

It does seem strange, however, that in this country, where the manufacture and uses of gas are carried to greater perfection than elsewhere, that some scheme has not been perfected; and it is to be hoped that some of the many gas engineers who have time to devote to such a subject will give it their attention. Perhaps there is no application of gas which presents a better field for cultivation to a gas engineer; and certainly any one completing a system at once simple, sound, and practicable, would confer an incalculable blessing on his fellow-men.

Before bringing my remarks on gas to a close, there is one more scheme to which I desire to draw your attention. Lately the obtaining of light from a mixture of air and the volatile portions of petroleum and other hydrocarbon fluids has been much talked of. Messrs. Treeshel and Clayton, of Manchester, and others have tried this system for lighting carriages. They proceeded in the following manner:—A vessel containing the fluid hydrocarbon, and pipes therefrom to the roofs of the carriages, were fitted up in a manner which may easily be conceived. Air was forced into the fluid-containing vessel from a flexible bag charged by the falling of a weight regulated by clock-work. In some trials the flexible bag was charged with the air emitted by a fan driven by the axles of the carriage, and such flexible bag then maintained the supply to the hydrocarbon container whilst the train was at rest at a station.

Complete success has not attended any of the trials of this system, so far as I am aware.

The objections are—

1. An explosive mixture is formed of air and the vapour of the hydrocarbon fluid carried in mechanical suspension therein.
2. The volatility of the fluid is affected by temperature.
3. The lights are uncertain.

It is also found that the fluid does not vaporize at the same rate during the different periods of its consumption, and in very cold weather the hydrocarbon liquid would not vaporize without the application of heat.

I now come to the consideration of olive oil as a lighting agent. This agent was used in the first passenger carriages placed on metal rails in this country and it continues to hold its place firmly.

The objections to it are numerous:—

1. It smokes considerably.
2. After being in use a short time the lamp wick becomes "charred."
3. The light given out very soon becomes reduced in intensity.
4. Grease spots arising therefrom destroy the drapery of the carriages.
5. It is expensive.
6. It entails great cost in trimming of lamps. Indeed so unsatisfactory is the light that many passengers who travel much during the night carry their own lamps.

The light from an ordinary first class is 3·6 candles. It is unnecessary that I should say more about it here, as its insufficiencies are known to you; but I propose to show hereafter its great cost as compared with gas and also with petroleum as a lighting agent, which I have now to notice.

Notwithstanding the repeated attempts to burn the light mineral hydrocarbons without a chimney, it is a fact that no lamp has been devised in which it can be burnt, in any quantity, without giving out considerable smoke. To fit a railway-carriage roof-lamp with a glass chimney is troublesome, and if it gets broken, as was the case with those I saw and had tried, the light is soon obscured by deposit of carbon on the glass.

After repeated trials I have succeeded in devising a very simple arrangement of lamp and lantern by which petroleum or paraffin can be burnt in lamps, and I have now the honour to submit a specimen one (one of the first made) to this meeting. Here the glass protector and the metal cover form one large chimney, so that the air inside is always sufficiently heated to make proper combustion. The air is admitted through the perforations and passes down into the glass protector, whence after performing its office of supporting combustion it escapes through the chimney into the compartment and thence into the air. It will be satisfactory to the members to know that the light from this lamp (the width of the light being 1⅛ inch) is equal to 6 candles, and that it is not affected by the speed of the train, nor does the wick get charred so as to reduce the light to any appreciable extent after upwards of 30 hours burning.

I have now, very imperfectly I feel, laid before you an outline of the present condition of the lighting of railway carriages, and shadowed out some improvements which may probably come into use. It now remains for me to address myself to a compasison of the value and advantages of the three agents which I have spoken of—viz.:

1. Carburetted hydrogen gas;
2. Olive oil; and,
3. Petroleum;

and, as I have had occasion carefully to investigate their value as lighting agents, the subjoined statistical figures may be relied upon.

Taking, then, for comparison sake, a train of six carriages, in which there are 27 lights, burning without interruption for eight hours, during a journey of, say, 300 miles, and six such journeys to be made on as many respective days.

	£	s.	d.
The gas consumed would be 3888 cubic feet, at, say, 3s. per 1000	0	11	8
The olive oil consumed (taking a first class, ordinary size) would be 5½ gallons, at 4s. 6d. per gallon . .	1	4	9
The petroleum, according to my lamp, just shown, 5½ gallons, at 2s. 3d. per gallon	0	11	10

These figures show that gas is the cheapest. I have estimated its cost at

3s. per 1000 feet, as for that sum the large town of Liverpool, and others in the north, supply it, equal in illuminating power to 15 candles per 3-feet bat's-wing burner per hour.

The foregoing statement shows the comparative cost of the lighting agents referred to, but without reference to the *difference of their illuminating power*. Introducing this as an element into the calculation, and taking that of olive oil as equivalent to . . . . . 3·6 candles

Of petroleum (burned in my new lamp) at . . . 6 "

And of gas, at 3 cubic feet per light per hour, at . 15 "

we obtain a still more startling result as the cost of supplying *the same quantity of light* to the train; and for the times previously given would then then be as under, by olive oil £1 4 9

Petroleum . . . 0 7 1

Gas 0 2 9½

Assuming, further, that there are 20,000 railway carriages employed in the country, each lighted by oil, with an average of three lamps, burning four hours per day all through the year, the cost would reach £83,646 annually.

Now, for the same light from gas at 3s., it would amount to only £9435; but, as no practicable system has yet been introduced for its use upon long journeys, it can, for the present, only be dismissed as a desideratum, very great, no doubt, but not yet attained.

Petroleum or paraffin can, however, be efficiently employed, and the same light from it as is now obtained from olive oil would cost only £23,939. This, as compared with £83,646 for olive oil, would effect a saving to the country in one year of the large sum of, in round numbers, £60,000.

I give these results after careful photometrical experiments, and if in any way they tend to improve the means of increasing the comfort of railway travellers, I shall feel that the amenities of membership of this association have fallen pleasantly on my shoulders.

The CHAIRMAN said the association were much indebted to the writer, whose experience as the gas superintendent of the London and North-Western Railway Company enabled him to speak with authority upon such a subject.

Mr. VEEVERS said it was not material to the question, but he was bound to say that he thought Mr. Hall had understated the charge for gas. It might be only 3s. per 1000 at Liverpool, but then there was the interest on capital, meter-rent, &c., which would increase the cost to the railway company. In addition to this, there was also the cost of the apparatus. He should like to have heard some statement as to the time required to fill this apparatus, and whether it was by the boiler system in the old way.

The CHAIRMAN said the writer did not give any detail as to how it was done, but he condemned the high-pressure and the boiler systems. The paper discouraged the notion of its being filled without machinery.

Mr. WOOD (in reply to a question) said there was no necessity by Newall's plan to have an increased pressure on the mains. The gas was sucked out of the main into the boiler by the withdrawal of the water. The time occupied was about 45 seconds, and the pressure 15 lbs. on the square inch, to fill a gasholder having a capacity of 245 cubic feet.

Mr. WARNER remarked that in King's system only half the quantity of flexible material was used to that employed by Mr. Newall. He inquired whether it was of the same description.

Mr. WOODS replied that he supposed it was. It seemed to be a vessel one-half of which was iron and the other half flexible. In the process of emptying, the top went inside the lower half.

The CHAIRMAN said King's drawings showed two systems—one to supply a single carriage, and the other a number of carriages.

Mr. WOOD said there was not such a large surface of flexible material exposed to the gas in King's system as in the other, and the less the better; but in this arrangement the flexible part seemed to be turned inside out every time it was emptied.

The CHAIRMAN said it was like the diaphragm of a dry meter upon a large scale.

Mr. GODDARD thought the association were very much indebted both to Mr. Wood and Mr. Hall for bringing the question of the lighting of railway carriages before the meeting. It was a matter of great importance, not only to the public, but to the gas companies of the country. The use of gas for the illumination of moveable bodies had been in operation for some years, and the floating bridge at Southampton had been thus lighted for a considerable time. As Mr. Sharp, of that town, was present, he should be glad to hear a statement from him as to the best mode which his experience had suggested of storing gas.

Mr. SHARP said it was perfectly true that the floating bridge across the Itchen had been lighted with gas for some years. The apparatus employed there was manufactured by Mr. Hulett, of Holborn, and had worked most satisfactorily. It was filled from the company's street-main in the usual way, and he had never heard any complaint.

Mr. IRONS, knowing the apparatus by which Mr. Hulett lighted up the floating bridge at Portsmouth harbour, wished to say a word or two upon the subject. He first broached the question to the Portsmouth Floating Bridge Company in 1857, but nothing was done, as the directors were not willing to go to the cost of trying the experiment. Mr. Hulett was then fitting up, as sub-contractor, the new barracks at Gosport, an account of which appeared in the JOURNAL OF GAS LIGHTING in 1859. There had also been given in the JOURNAL an account of the apparatus and mode of lighting the floating bridge at Portsmouth. So successful was the experiment when made, that the proprietors of the floating bridge over the Itchen, at Southampton, made inquiries as to the principle adopted, and resolved upon having their bridge lighted in the same way. They had a small gasholder on board the bridge, which, as many of the members were aware, consisted of a large steam floating vessel crossing the river on chains that gave it a fixed track, to prevent it interfering with vessels going up and down the harbour. Formerly the company paid something like £20 or £25 a year for oil for illuminating purposes; they now paid the Gosport Gas Company something like £15 a year for gas, for a very much better light. The officers of the port crossing to and fro took frequent opportunities of expressing their satisfaction at the change that had been made from oil to gas. The bridge crossed the harbour in about ten minutes, and stopped five minutes at each side. The passengers were now able to read their books and newspapers during the night, whereas formerly, from the dimness and unsteadiness of the flame, they could hardly see at all. The proprietors were so far satisfied with the working of the apparatus, that two years ago, when a new bridge was to be contracted for, which cost £10,000, they made an express stipulation that each design sent in should include arrangements for lighting the bridge with gas, and they had a holder made purposely. The holder originally constructed by Mr. Hulett had an arrangement of the weights which could be easily attached so as to give a suction of 8/10ths, if required, and they were able to fill the holder, which had a capacity of 200 feet, in five or ten minutes. But the holders on the new bridge were constructed in a different manner, and required a very strong pressure put on to supply them, and could only be filled in the daytime, as there was no arrangement for filling them at night without affecting the other lights. The bridge company called upon the gas company to put on pressure expressly for them, but this was declined, as the loss from leakage would have taken away any profit obtained from the supply of the gas. Under those circumstances, they called in Mr. Douglas, and he had so arranged the apparatus as to effect all that was necessary, and the bridge had now been running for twelve months in a perfectly satisfactory way.

Mr. SHARP said there was no complaint at the Southampton Bridge of a want of pressure. The gasholder was filled during the daytime at the ordinary street pressure.

On the motion of Mr. GODDARD, seconded by Mr. BROADHEAD, a vote of thanks to Mr. Hall for his paper was unanimously passed.

Mr. GODDARD asked Mr. Wood to state the mode in which the Bury Gas Company supplied the different stations on the Yorkshire and Lancashire Railway.

Mr. WOOD said they contracted with the railway company to supply them with gas at 2s. 8d. or 2s. 8½d. per 1000 cubic feet, and they found it economical to compress the gas in a holder on Mr. Newall's plan, and having charged a portable boiler with nothing but gas, compressing it to 20lbs. or 30lbs. to the square inch, conveyed it along the line to light their roadside stations. A holder so filled would suffice for several days consumption. He did not know the exact cost, but he was given to understand that they could employ gas much cheaper than by using oil or naphtha.

Mr. GODDARD inquired whether there was any sensible depreciation in the illuminating power of the gas by being compressed and conveyed from one station to another.

Mr. WOOD replied, a very little. He had often noticed the lights and had made inquiries of the officials, from whom he gathered that there was no really appreciable loss. In fact he had compared the lamps burning in the station at Bury and in the carriages side by side, and convinced himself there was no difference.

Mr. SHARP presumed that the gas referred to was manufactured from cannel.

Mr. WOOD said about one-fifth of coal was used.

Mr. NEWBIGGING said on the previous day it was stated that the cost of the water seriously detracted from the value of the apparatus. He was afraid that the effect of using water would be to run up the cost of the gas for these purposes to such an amount as to make it no cheaper than lighting with oil. He had seen a very ingenious modification of the plan, invented by a young man in a Lancashire village. Instead of the gas being forced from the boiler by the water pressure, there was a flexible casing which filled the inside of the boiler; when this was inflated with gas, a quantity of air was pumped into the boiler at a high pressure, and this air being compressed against the inflated casing caused the gas to be driven out at the extremity of the boiler. This was a plan which would be of great service in places where a supply of water was difficult or costly to obtain.

Mr. WOOD said the mode adopted on the Metropolitan Railway and at the London stations of the Great Northern and Great Western lines, was to fill the apparatus by means of a heavy gasholder. They thus got something like 18 or 20 inches of water pressure, and were able to fill a 240-feet holder in a few minutes.

Mr. PARKINSON said the great pressure required to fill the box was entirely owing to the smallness of the pipes employed. An experiment was now being made at the Broad Street station on the North London line. An 8-inch pipe was used, and they had a meter capable of passing 10,000 feet per hour, by which means they were able to fill a box of 130 or 150 feet capacity in one minute. The apparatus was now at work—the boxes were filled direct from the street-mains through this large pipe—and there was no difficulty about it at all. The ordinary day pressure of the mains was found quite sufficient for the purpose.

Mr. WOOD said the Great Northern Company had a main from the Imperial Gas Company's station at St. Pancras direct from the outlet of the gasholder, and they got 6 or 7 inches pressure.

Mr. KIRKHAM, in answer to the chairman, said the pressure in the case last referred to by Mr. Wood was 6½ inches. He did not know the size of the meter employed.

Mr. G. D. MALAM read the following paper:—

DESCRIPTION OF AN IMPROVED DISTRICT GOVERNOR FOR REGULATING THE SUPPLY OF GAS AT HIGH LEVELS.

It is a trite observation, and one the value of which you gentlemen whom I now address fully understand, that it is a matter of the utmost importance to the well-being of a gas establishment to reduce the gas unaccounted for to the very lowest limits possible; and as a means for gentlemen who have charge of gas-works in hilly or mountainous districts to attain this desirable object, I have proposed to give you a description of a new governor that has recently been invented by my friend, Mr. Orlando Brothers, the engineer of the Blackburn Gas-Works.

By way of preface, I may state that in districts with abrupt undulations, where during the day, from the peculiar construction of the common water governor, a heavy pressure must be maintained in order that there may be an ample supply of gas at night, this new governor will be found to be of great value, as by its action the night pressure at the works can be transmitted through all the governors constructed on the new principle, and the same gradually taken off when desired; consequently the day outlet pressure upon the various street governors may be reduced to the maximum requirements of the day, instead of being maintained at the maximum requirements of the night.

As a practical illustration of the action of the ordinary water governor for those who have not had to deal with the distribution of gas in exceedingly hilly districts, I will give a few details from experiments I have made with the governors at Halifax.

Taking the initial day pressure at the works to be 7/10ths, I find that the pressure on

No. 1 street governor at the inlet is	6-10ths,	outlet	6-10ths		
2	"	"	12-10ths	"	11-10ths
3	"	"	17-10ths	"	13-10ths
4	"	"	17-10ths	"	15-10ths
5	"	"	19-10ths	"	11-10ths

But when the works initial pressure was raised to 16-10ths, the pressure on

No. 1 street governor at the inlet was	15-10ths,	outlet	12-10ths		
2	"	"	20-10ths	"	12-10ths
3	"	"	17-10ths	"	14-10ths
4	"	"	17-10ths	"	15-10ths
5	"	"	19-10ths	"	11-10ths

Now these details fully show that the works night pressure does not affect the outlying governors constructed upon the old model, so that, as before stated, the maximum night pressure must be maintained during the day on those governors, in order that the district controlled by them may be effectively supplied with gas at night.

All the excess of pressure between the maximum requirements of the day and the maximum requirements of the night is got rid of by the ingenious construction of the new governor, for the pressure when put on at the works will be transmitted to all the governors. Hence the day pressure need be no more than the maximum demand of the day, and not, as at present, in accordance with the maximum demand of the night.

To those therefore who have charge of districts with varied altitudes, a governor that will perform such work as I have previously mentioned will be a great boon, as they will be able to reduce the heavy day pressures that must be maintained on the outlets of governors constructed as at present.

I will now describe the new governor as invented by Mr. Brothers.

It consists in forming the float or gasholder of the governor with a chamber called the "difference chamber," marked A on the plan, which is connected to the atmosphere by the pipe B.

A "gas-chamber," marked C, is formed above the water-line by enclosing the float with a plate, and in connexion with this chamber is the pipe D, by which the inlet pressure is made to act on the top of the float as well as underneath through the ordinary inlet communication.

As a certain area of the underneath surface of the float (viz., the area of the "difference chamber") is connected with the atmosphere, and therefore not under the action of the upward pressure of the gas, the downward pressure, acting as it does upon the whole upper surface of the float and consequently upon a greater area than that assigned to the upward pressure, gently overcomes the upward pressure, forcing the float downwards, thereby opening the cone valve, and as the immersion of the float will be greater or less as the inlet pressure increases or diminishes, so must the valve be opened or closed and the outlet pressure increased or diminished.

When the governor is fixed, water will have to be run into it until the inlet pressure is reduced on the outlet to the pressure required during the day; thus by regulating the water-line any pressure on the inlet can be reduced at the outlet to that which may be desirable.

The only attention afterwards required will be keeping the water-line to its adjusted level, for when the pressure is increased at the works it will cause a similar increase of pressure on the inlet of the governor, which by opening the valve as already described will give a corresponding increase on its outlet, and as the pressure is reduced the float will rise, thus reducing the pressure to the point at which it was adjusted.

In constructing these governors, the "air-chamber," "difference chamber," and cone will have a relative proportion one to another according to the size of the inlet and outlet.

Mr. WARNER inquired where this governor was fixed.

Mr. MALAM said it was placed on the main itself, either above or below ground, as most convenient. The action of the ordinary governor was to cut off the pressure in the street when it was put on at the works, so that if the street pressure were regulated by the maximum requirements of the day, it would not be sufficient for the night.

Mr. WARNER asked in what respect this differed from the ordinary governor. Say they had an inch pressure at the works, or, leaving pressure altogether out of the consideration, say they had a hill, and half way up that hill a governor, if it was required to reduce the pressure during the day, would not the ordinary governor suffice for the purpose?

Mr. MALAM said no doubt it would reduce it, but one would not dare to attempt to reduce it to the maximum requirement of the day, having regard to the maximum requirement of the night.

Mr. BRADDOCK thought Mr. Malam should have explained that this was a secondary governor. The object of it was to regulate the supply during the day, and it was fixed at that, and so fixed that when the night pressure was put on, this governor immediately went out of action. By its use they could get two fixed pressures.

Mr. MALAM said the real object was to regulate the pressure upon the outlets in the streets during the day. The governor at the works did not regulate the pressure upon the outlets. The new governor differed from the ordinary one in that in a hilly district, when the pressure was increased at the works it would also be increased up the hill, so that there would be no necessity for sending a man up the hill to increase the pressure there.

Mr. METHVEN said the town of Oporto was very hilly, and there was a difference of 150 feet between the levels of the highest and the lowest mains. So much influence had this on the lights, that when the pressure was reduced to 2 inches at the works there was often a vacuum in the mains at the lowest part of the town. After hearing of this circumstance, he wrote to a friend of his who was the lessee of the works there, and recommended the employment of a governor introduced to the notice of the association at the meeting at Manchester. It was the invention of Mr. Adamson, and consisted of a leather diaphragm connected with a common throttle-valve in the line of the pipe. Two of these were purchased—an 11-inch and a 5-inch—and sent out to be fixed at Oporto. His friend some time afterwards wrote and told him he had experienced great advantage from their use—in fact, he was almost afraid to say how many thousand feet of gas had been saved.

Mr. FRASER said where the elevation of a town was considerable, he could easily understand that such a governor as that described in the paper would be a great boon.

Mr. MALAM said the difference in the levels at Halifax was something like 400 feet.

Mr. HODGSON JONES said all the members of the association were naturally interested in the question of regulating the pressure of gas throughout the district supplied, and they were familiar with the various means used for the purpose. With respect to diaphragm governors, he had always been afraid to use them in consequence of observing in experiments their tendency to oscillation. If anything caused them to commence oscillating, they would continue to do it for perhaps a space of ten minutes. Whether that would be the case in practice or not, he was not prepared to say, for he had not had the hardihood to try them, more especially as the mercury governor had always effected everything he desired to accomplish. Of course at the works he had used the cone governor, and with that and a careful districting of the town, according to the varying levels, he had experienced no difficulty in bringing the pressure to such a state of regularity as to furnish a satisfactory supply.

Mr. METHVEN remarked that in diaphragm governors the oscillation was very much prevented by their being closed at the top, and having a small pipe from the top which was led to the side of the street, so that any large amount of air could not pass to and from the top side of the governor. Small mercurial governors were liable to oscillation, and the larger sizes were very expensive. The diaphragm governor made by Mr. Adamson cost about £1 per inch, and was fixed in the line of the main.

Mr. WOOD said these diaphragm governors were, he believed, liable to the objection stated by Mr. Malam—viz., that one fixed pressure only could be obtained. If 10/10ths or 15/10ths were put on at the works, the same amount of extra pressure was put on at the outlets; or whatever the increased pressure was put on at the works, in the same proportion the pressure was increased at the outlets.

Mr. FRASER inquired the cost of the new governor, and how it was fixed.

Mr. MALAM said it was fixed in the ordinary way in buildings, and if not, underground.

Mr. HODGSON JONES thought in many cases it would be difficult to get ground for the purpose.

The CHAIRMAN: How many of these new governors are there at Halifax?

Mr. MALAM: We have about 22 or 23 altogether. I fully expect that by the adoption of this governor we shall be able to reduce the present pressure and make the works much more profitable.

The CHAIRMAN said there could be no doubt as to the great value of the communication which Mr. Malam had made, and he was sure the association would accord him a vote of thanks on this occasion. He could only say that as far as his experience went, it was clear that the best mode of regulating the supply was to do it at the works themselves, by the use of mains of a suitable capacity; but there were localities in which nature overcame them in consequence of inequalities of level, and the pressure could not be regulated simply at the works. In that case some artificial means must be devised to overcome the natural difficulties. In the new governor the action of the gas on the top of the governor depressed the cone, and so regulated the supply. As to the diaphragm governors, he had only a slight experience with them, but he believed the oscillation might be overcome in the manner spoken of by Mr. Methven—the covering of top of the governor and the application of a small pipe to the side.

The reading of papers being concluded, the meeting proceeded to the election of the committee of the association for the ensuing year; Messrs. Malam and Blackburn being appointed scrutineers.

Mr. GODDARD proposed an alteration in the rule to the effect that the committee consist of nine members, three of whom should go out of office every year.

Mr. VEEVERS seconded the motion.

The CHAIRMAN decided that it was not competent, without previous notice, to propose a constitutional change of this nature.

Mr. GODDARD then moved that the committee be requested to bring the matter before the association at its next meeting.

Mr. LONGWORTH suggested that before electing the committee it would be better to fix the place for holding the next annual meeting, which was agreed to.

The CHAIRMAN said the committee had had this matter under consideration, and recommended that it should be at Nottingham.

A discussion ensued upon the subject, in the course of which York, Leeds, Liverpool, and London were suggested. Ultimately, on the motion of Mr. WARNER, seconded by Mr. ELDRIDGE, it was unanimously resolved that the next annual meeting of the association be held at Nottingham.

During the time that the balloting papers for the election of the committee were being collected,

Mr. HUNTER took the opportunity of bringing under the notice of the association a subject in which he felt a deep interest. About three years ago, he said, he wrote a letter to Mr. Barlow, asking him to lay before those who were engaged in the profession, the propriety and urgent necessity there was that they should join together to form an institution for the relief of aged and decayed members. All other trades and professions had institutions of the kind, and he thought it would be well that the subject should receive the consideration of the British Association of Gas Managers. He had no thought himself, should such an institute be formed, that he should become a participating member, but he should be happy at once to put down his name as a contributor to its funds. In the meantime he would like to hear the opinion of gentlemen present as to the advisability of such a project.

The CHAIRMAN said he regretted that so few persons connected with the gas-works of London had as yet joined this association. He did not know what their peculiar views were, but he was aware that a few years ago they did attempt to found an association among themselves, which was abandoned for some cause or another. With reference to the particular subject referred to by Mr. Hunter, he might state that he made inquiries on one occasion to ascertain whether anything could possibly be done among the London companies in the shape of an assurance and benefit society; but he found that in most cases they had their own arrangements with that object in view, and they said, so long as that was the case, there was nothing to induce them to contribute on a larger scale. Whether the time might now have come when, a greater degree of unity existing amongst the companies, the question would gain more acceptance with them, he was not prepared to say. Possibly it might, and something upon a more extensive scale could be originated.

Mr. HUNTER said he had mentioned the subject to some friends, and objections had been raised to it, amongst others that the members of the profession were well paid, and ought themselves to make a provision for old age. That might to a certain extent be true, but it was not always the case that they were in a position to help those who depended upon their labours, when sickness and age came upon them. Such an institution might be enlarged so as to include in its membership the inspectors and collectors, whose salaries were not usually very large, and whose energy, perseverance, and urbanity amongst the consumers contributed very much to the pleasant working of the operations of a gas company.

Mr. BROADHEAD said he hoped it would be distinctly understood that this was an association for the furtherance of scientific and practical knowledge, and that they were not about to turn it into a benefit or assurance society. There were plenty of institutions, having those objects in view, which were open to the profession; but the more the members of this association confined themselves to the legitimate objects with which they set out the better.

Mr. HUNTER wished it to be distinctly understood that he did not desire that such an institution should be connected with this association. His only motive in mentioning it was to bring the subject under the consideration of the members.

Mr. GODDARD said there was one matter with reference to the business of the association which had to be attended to, and that was, the suggested increase in the amount of subscription. The present amount was found quite inadequate to meet the expenses necessarily incurred, and he therefore proposed—"That the subscription to the association be increased from half a guinea to a guinea."

Mr. VEEVERS seconded the motion.

Mr. BROADHEAD said, when the question was mentioned on the previous day, he felt quite agreeable to the proposed increase, for he never liked to see the balance on the wrong side of the account. But, now that they had 39 new members, he thought the difficulty was removed, because it was not at all necessary they should have a large reserve-fund. He suggested, therefore, that they should try another year upon the present scale of subscription.

Mr. GODDARD reminded the meeting that, but for the liberality of two gentlemen connected with the association, the balance-sheet last year would have shown a much more unfavourable aspect. He did not think they should be dependent upon such extraneous help for the maintenance of the efficiency of the association. Besides, there were other matters for which a further supply of money was needed. It was thought by some members that the transactions of the society should assume rather more of the character of those of other scientific societies, who published their papers and discussions illustrated with diagrams. If they could do that, it would make their transactions increasingly valuable, but they must have money for the purpose, and even if they doubled the present subscription there would be little or no surplus beyond this expenditure.

Mr. FRASER supported the proposition, as he thought it tended to prevent persons who had not joined the association from enrolling their names when they found the balance on the wrong side of the account.

The CHAIRMAN said he was afraid that with regard to this proposition of Mr. Goddard's, he was in the same position that he was in with regard to the last. The 27th rule of the association fixed the subscription at "not less than half a guinea," and the question was whether this was not such a constitutional alteration as to render notice of motion necessary. There was nothing to prevent the meeting passing a resolution recommending the members to increase their subscriptions, but leaving it optional with them to do so.

Mr. GODDARD said he should be happy to submit his motion in that form. What he had already said was sufficient to show the necessity for increased contributions. He therefore moved—"That the members of the association be invited to increase their subscription for the current year to one guinea, and that the committee be requested to take into consideration the propriety of raising the subscription to that sum."

Mr. FRASER seconded the motion as amended.

Mr. HAWKSLEY asked to be allowed to make a suggestion. He thought personally it was rather hard upon members connected with country works, whose salaries were small and whose families, perhaps, were large, that they should be obliged hereafter to contribute a guinea instead of half a guinea. He recommended, therefore, this addition to the motion—"That with respect to existing members, no one shall cease to be a member by reason of not increasing his subscription." He hoped they would take warning from what had occurred in another institution, and that this association would by no means become an aristocratic association. It might, and, indeed, it was desirable, that hereafter the present rate of subscription should be doubled, because many gentlemen had contributed most valuable papers which could only be thoroughly intelligible by means of illustrations. To print those papers and add proper illustrations must be a matter of considerable expense, which could only be met in this way. But it was a matter of great importance that they should keep good faith with all those gentlemen they had induced to join their ranks; and there might be some members not present on this occasion who would regard it as scarcely just to pass a resolution doubling the subscription without at least a previous intimation. He suggested therefore, with great respect to the opinions expressed by other gentlemen, that there should be an option given in the matter, and that no one should be excluded by reason of not increasing his subscription.

Mr. GODDARD said his resolution referred the question to the committee for their consideration, and he was quite sure that the suggestion just thrown out by the president would meet with the most patient attention. There were other expenses connected with the association than the printing of their transactions. The gentleman who had mainly conducted their business was very inadequately remunerated for his valuable services. He had very kindly undertaken the duties of secretary, which was a very onerous office, and no one scarcely could conceive the amount of correspondence he had to carry on. With an increased exchequer he (Mr. Goddard) would feel it was the duty of the association to make Mr. Blackburn some more adequate return for the labours which his position cast upon him.

The HONORARY SECRETARY said he was very much obliged to Mr. Goddard for the kind expressions he had used in speaking of his services, but he wished the association to understand that he had no desire to be considered their paid secretary. He would rather be looked upon as the honorary secretary, and do the work as before.

Mr. BRADDOCK said the association were very much indebted to the JOURNAL OF GAS LIGHTING for reporting their transactions up to the present time. Still he felt that they ought to print their own transactions, with proper illustrations; and he was sure if each member received a copy it would compensate him for the additional subscription.

After some further observations by Mr. Milne, Mr. Paterson, Mr. Woodall, Mr. Warner, and Mr. Longworth,

The CHAIRMAN suggested that the resolution should take the following form—"That donations from the members of the association be invited in aid of its funds, and that the committee be requested to take into consideration the raising of the subscription of future members."

The resolution in this form was put, and agreed to unanimously.

The scrutineers reported the result of the ballot to be as follows:—

President—Thos. Hawksley, Esq.
Vice-President—Thos. G. Barlow, Esq.
Treasurer—H. Newall, Esq.
Honorary Secretary—James Blackburn, Esq.
Committee.

Messrs. Goddard	Messrs. Simpson
Esson	Cathels
Wood	Hall
Fraser	

Auditors—Messrs. Newbigging and Leather.

On the motion of Mr. BROADHEAD, seconded by Mr. LONGWORTH, it was resolved that the next annual meeting be held on the 11th and 12th of June, 1867.

The HONORARY SECRETARY: On behalf of the committee of the association, I beg to move—"That the thanks of this meeting be given to Mr. Thomas Kirkham, of the Imperial Gas-Works; to Mr. W. Sugg, of Westminster; and to the other gentlemen who have kindly forwarded apparatus for the inspection of the members."

Mr. NEWALL seconded the motion, which was unanimously adopted.

Mr. CHAMBERS moved, and Mr. MARTIN seconded, a vote of thanks to the president, vice-president, committee, and officers of the association, for their able management of the affairs during the past year.

The resolution was cordially adopted.

Mr. CRAVEN moved, and Mr. BROADHEAD seconded, a vote of thanks to Mr. Adamson, the late treasurer of the association, which was unanimously adopted.

On the motion of the HONORARY SECRETARY, seconded by Mr. MALAM, thanks were voted to Mr. W. H. Bennett, the local secretary, for the kindness and energy displayed by him in connexion with the arrangements for the present meeting.

Mr. LONGWORTH moved—"That the thanks of the meeting be given to the chairman for the kindness and courtesy displayed by him, and for the efficient manner in which he has conducted the business of the sitting."

Mr. BROADHEAD seconded the motion, which was carried unanimously.

The CHAIRMAN, in acknowledging the vote, said he had only to regret that the president was absent at the commencement of the proceedings. He had done his best to discharge the duty cast upon him, and was obliged to the meeting for their kind appreciation of his services.

A very cordial vote of thanks was also given to Mr. Hawksley, the president, for his conduct in the chair on the previous day.

Mr. HAWKSLEY said he felt greatly indebted to the association for the honour done him. He considered himself favoured in holding not only the office to which they had appointed him, but any office in which he could be of service to them. He did not intend under any circumstances to discontinue his connexion with the association. He was pleased to learn that during his absence they had decided to hold their next annual meeting at Nottingham, and he had only now to beg that on that occasion they would consider themselves as his guests, and would dine with him at the George the Fourth Hotel on the day of their meeting.

FRIDAY, MAY 25.

This morning a party of about 40 members of the association met at Hungerford Pier at ten a.m., and proceeded by boat to Millwall, where they visited the tar-distilling and creosoting works of Messrs. Burt and Co. From thence they went by train to Hackney Wick, to the tar-distilling works of Mr. W. Davey, and the nitro-benzole and aniline works situated in the same neighbourhood; afterwards calling at the Hackney station of the Imperial Gas Company.

Other members of the association formed themselves into parties and visited a number of the metropolitan gas-works, and other places of interest, and the proceedings of the third annual meeting were thus brought to a close.

REPORT ON EXPERIMENTS WITH RESPECT TO THE VENTILATION OF SEWERS.

By J. W. BAZALGETTE, Esq.

Extract from Board Minutes, 27th of April, 1866 (*No.* 4).

Resolved,—"That the engineer do report, in writing, what experiments have been made during the last twelve months, by himself and the assistant engineers, with respect to the ventilation of the sewers of the metropolis, and what has been the result of such experiments."

In compliance with the above resolution, I beg to report that my attention, during the last twelve months, has been more particularly directed to the consideration of the four following modes of preventing the escape of noxious effluvia from sewers:—

1st. By the use of charcoal ventilating grates.
2nd. By ventilation through chimney-shafts and furnaces.
3rd. By ventilation through pipes carried to the tops of buildings, &c.
4th. By diluting the sewage with water.

With a view of testing the efficacy of charcoal as a deodorizing agent, I have had experiments made by fixing to the ventilating shafts of certain of the main sewers, in lieu of the open and ordinary air gratings, iron boxes having grated apertures in one half, and in each box are placed four iron trays with net-work bottoms, covered with layers of broken charcoal. Twenty-two of these boxes, with the requisite fittings, have been placed in shafts in the following streets on the north side of the river:—

Grove End Road, St. John's Wood.
Albion Road, Hammersmith.
Tottenham Court Road, by Tudor Place.
Do. do. by Euston Road.
Do. do. by New Oxford Street.
Robert Street, by Hampstead Road.
Page Street, Westminster.
Great Russell Street, by the British Museum.
Smith Street, by Queen's Road, Chelsea.
Cleveland Street, by Carburton Street.
Montague Street, by Russell Street.
Stafford Street, by Marylebone Road.
Albany Street, by Regent's Park Barracks.
Endell Street, by Castle Street, Long Acre.
Horseferry Road, Westminster.
Pelham Street, by Pelham Crescent.
Hunt Street, Whitechapel.
King John's Court, Three Colt Street.
Goswell Road, by Great Sutton Street.
Do. by Pear-Tree Street.
Queen's Road, Dalston, by Lavender Grove.
Do. do. by Albion Road.

From observations made in Page Street, Westminster, steam and effluvia were found issuing from the sewer at one of the ordinary ventilating gratings, at the intersection of Johnson Street with Page Street, a short distance below the charcoal trays placed in the adjoining ventilating shaft; whilst, through the charcoal, there was a very slight, if any, escape perceptible; but upon opening the side-entrance flap opposite the charcoal tray, the steam and effluvia escaped in considerable quantities. An examination within the sewer showed that it contained steam, mixed with foul gas, and that there was a decided air current in the sewer, not through, but past the charcoal deodorizer, in a direction contrary to the ordinary flow of the sewage. On lifting the charcoal trays out of the ventilator, so as to permit a free outlet for the gases in the sewer, a similar escape of steam and foul vapour was noticed, as in the case of the air-shaft at Johnson Street and the side-entrance above referred to. The air in the sewer in Tottenham Court Road, where three of the charcoal deodorizers have been placed, has also been observed from time to time, and, like that in the Page Street sewer, its ventilation was found to be imperfect. Similar observations, with the same results, have been made in the sewers in the Goswell Road and Queen's Road, Dalston.

On the south side of the river two of the charcoal boxes, with the trays and fittings complete, have been fixed in the ventilating shafts of the sewer in the Spa Road, Bermondsey. One has also been placed in a shaft of the sewer in Prospect Place, and one in that of the sewer in Drummond Road, Bermondsey. Upon the low level main intercepting line of sewer trays have been adapted to seven of the existing ventilating gratings, five being

in High Street, Putney, one in Wandsworth Lane, by High Street, and one in the Old Kent Road, near Ossory Street. The results of the observations made in these were also similar to those obtained on the north side of the river—namely, that whilst there is no complaint of foul smell emanating through the grating, the charcoal appears to have the effect of diminishing the current of air through the ventilators and of confining it to the sewers, so that if the system of ventilation by means of deodorizers were generally adopted, it would certainly become necessary, for the safety of the men working in the sewers, to greatly increase both the number and size of the shafts. It has been found requisite in wet weather frequently to renew the charcoal which, even though protected from the rain, is affected by the damp atmosphere.

In order the more satisfactorily to test the efficiency of this mode of ventilating sewers, I have, in conjunction with Dr. Miller, professor of chemistry, instituted a more complete and comprehensive experiment on a continuous line of sewer. Dr. Miller was of opinion that such an experiment could not be satisfactorily made except in hot weather, and, consequently, his observations were for a time delayed, and will probably extend over the present summer. The sewer selected for the purpose is that portion of the King's Scholars' Pond sewer extending from Park Road, Regent's Park, along the Avenue Road, &c., to the "Swiss Cottage," St. John's Wood, a length of between 4000 and 5000 feet. The whole of the gullies on this piece of sewer have been trapped, a valve has been fixed at its upper end, and deodorizing boxes of an enlarged size, with the necessary trays and fittings, are placed in the several air-shafts. These preliminary operations completed, we have been, and are still engaged in, ascertaining the condition of the air in the sewer, the velocity and direction of its air current, and its temperature by daily observations. I am at present unable to report the result of these observations, but our object is to ascertain the effect of the charcoal upon the atmosphere within and above the sewer, both in its mechanical and chemical action.

Experiments in the plan of ventilation by means of an air-flue, connecting the sewer with the high chimneys of factories, or other buildings, have been tried in two localities—namely, at Woolwich Dockyard and at the Deptford pumping-station. At the former place the southern outfall sewer is ventilated through air-flues connected with two of the furnace chimneys, and the same sewer is also connected by a flue with the chimney-shaft at Deptford pumping-station.

These connexions produce a considerable draft up the chimneys from the sewer, and the effect has been considered beneficial by those residing in the immediate locality; but we were unable to get air-shafts of sufficiently large diameter to command the full benefit which might otherwise have been obtained.

Another plan—namely, the connexion of a sewer by means of air-flues with the catchpits of furnaces—has been tried under similar conditions to the former plan, and with a like amount of success, at the Deptford pumping-station, Crossness pumping-station, Woolwich Dockyard, and at Mr. Lyon's bleaching-works, Old Kent Road. This plan has the advantage over the former of decomposing the foul air by passing it through the fire; but the draught in the sewer is not so strong as when the flue is connected directly with the shaft, and it is subject to interruption when the doors or plates in front of the ashpit are opened for the removal of ashes or for other purposes. The most perfect examples of this plan are in operation at the board's Deptford and Crossness pumping-stations for the ventilation of the low level and outfall sewers. At Woolwich Dockyard and at Mr. Lyon's works a modification of the plan is adopted, at the former for ventilating the outfall sewer, and at the latter for the White Post Lane sewer. Both of these connexions are upon sufferance only, and great difficulty has been experienced in getting the consent of the owners of other factories to such connexions being made with their furnace-shafts; moreover, in many parts of the metropolis there are no such factories.

Past experiments have demonstrated that the establishment of a sufficient number of furnaces for the purposes of ventilation would be so enormously costly that this plan does not appear to be generally applicable, though it might be adopted with great advantage in localities where existing furnaces can be made available. A further experiment is now in hand, with a view to ascertain more definitively the cost and effect of sewer ventilation by gas-burners.

The third plan—the carrying to a considerable altitude up the sides of houses or other buildings pipes from the crown of the sewer—has been tried in the following localities on the south side of the river, advantage having been taken, in several case, of favourably situated rain-water pipes:—

Canterbury Row, corner of Old Kent Road, 6-inch pipe carried above level of roof.
Canterbury Row, near White Post Lane, 6-inch pipe carried 8 feet above top of parapet of railway arch.
White Post Lane, two 6-inch pipes 10 feet above the surface of the land in two places.
No. 19, White Post Lane, 6-inch pipe carried above level of roof.
No. 74, Albert Street, Deptford, 4-inch pipe carried above parapet wall.
No. 47, Albert Street, pipes from sewer connected with rain-water pipes.
Baker's shop, Victoria Road, do. do.
Chapel, Victoria Road, do. do.
North Pole Lane, Greenwich, two 5-inch pipes carried up in angle of railway abutment to within 18 inches of parapet wall.
Walton's Wharf, Ravensbourne Street, Greenwich, two 5-inch pipes carried above level of roof.
Nos. 2 and 12, Ravensbourne Street, two 5-inch pipes carried above level of roofs.
No. 2, Norway Street, Greenwich, two 6-inch pipes carried above level of roof.
Boiler factory, Thames Street, Greenwich, two 5-inch pipes carried above shed in yard.
Thames Street, corner of Horseferry Road, two 5-inch pipes carried above level of roof.
Corner of Cross Street and Thames Street, two 5-inch pipes carried above level of roof.
Trinity College, Greenwich, two 6-inch pipes carried up side of garden wall.
Corner of Chester Street and a new street, Greenwich, two 5-inch pipes carried above level of roof.
Corner of Chester Street and Pelton Road, two connexions with rain-water pipes.

In carrying out this plan care has, in every case, been taken that the top of the pipe should be above the level, and at a distance from the attic or upper windows of the buildings, and in none of the foregoing instances has any complaint been made by the residents of smell or inconvenience arising therefrom. Great difficulty was, however, experienced in getting the consent of the majority of the occupiers of the houses to such an arrangement, arising from the fear that the foul gases, under certain conditions of the atmosphere, would descend the chimneys or enter the upper windows, and this fear would, in my opinion, render a universal adoption of the plan impracticable, otherwise the cost of maintenance would be trifling. The current of air through the pipes appears to be constant, having the same appreciable effect in the sewer as an ordinary ventilating shaft. At the rear of the Bounty Office, Greenwich Hospital, a brick shaft, 30 feet high, 14″ × 9″ in the clear, has been erected over the sewer, producing in the latter a current of air equal in velocity to 300 feet in four minutes.

With regard to the fourth plan, the dilution of sewage with water, it is difficult to determine what minimum quantity of water will sufficiently dilute sewage to prevent the escape of the noxious gases therefrom, inasmuch as the products of the gases vary considerably in different sewers, and the varied conditions of the atmosphere, the rapidity of the currents, and other circumstances, more or less affect the process of decomposition, and the gravity of the sewer gases; but taking the sewage of the north side of the river at 62½ million gallons per diem, and assuming this to be diluted with an equal volume of water for 12 hours per diem (for six months in the year), in which time probably two-thirds of the sewage would pass through the sewers, the necessary addition to the present water supply would be about 42 million gallons per diem.

I have endeavoured to ascertain how far this quantity could be obtained from the present London water companies, and have, with this object, communicated with them, and in reply to my inquiries I am informed that the Chelsea and the Grand Junction Water-Works Companies estimate that they could each deliver, daily, during dry weather, one million gallons per diem, at the rate of 6d. per 1000 gallons; the West Middlesex Water-Works Company from 500,000 to 1,000,000 gallons, at the same rate of charge, and the East London Water-Works Company, one million gallons at 9d. per 1000. The New River Company state that they could afford no supply from their existing mains, but would be prepared to lay down new and separate mains, and fix their charge, as soon as they are informed of the exact points of discharge and the quantity required at each. The Regent's Canal Company state that, during the past year, they have erected five sets of pumping machinery, with a view to increase, on the lower levels of their navigation, the supply of water given by their reservoirs; and that by an extension of similar machinery along the line of the canal to its summit at Paddington, the company would be enabled to deliver a large quantity of water at different points, and probably sufficient for the purpose of cleansing the metropolitan sewers, at a charge of not less than 3d. per 1000 gallons. The Grand Junction Canal Company can afford no supply during the summer months.

It will thus be seen that, with the exception of the Regent's Canal Company, whose statement is very vague, and from whom I have at present been unable to get a more definite reply, but a small proportion of the quantity of water requisite for the general dilution of the sewage could be obtained from the existing companies; and assuming that the Regent's Canal Company could supply the whole quantity required, unless it could also be used for domestic or other purposes, the cost would be too great to admit of its being purchased upon such terms for flushing sewers alone.

On the south side of the river the Kent, the Southwark and Vauxhall, and the Lambeth Water Companies could supply a total daily quantity of about six million gallons of water, but the sewage there is so much less in quantity, and the sewers of the district are so favourably situate for getting supplied from the Thames and from the upper portions of the Effra and Falcon Brook, that the pumping necessitated at the outfalls forms almost the only limit to the means of flushing the greater portion of those sewers.

In order to perfect this mode of cleansing the Metropolitan Sewers, much has already been done by rendering the flow in the main sewers continuous, instead of intermittent as heretofore, and much yet remains to be done in the way of removing deposit accumulated during many years, re-constructing old and defective sewers, and so connecting and arranging the local sewers as to form a complete net-work, through which the water could be under perfect command and made to flow, by various routes, to the outlets.

SERIOUS GAS EXPLOSION AT BRIGHTON.

A gas explosion of a rather serious character took place in Brighton on Monday night. The Blackrock Gas Company are now relaying the mains along the King's Road, and for the past day or two there had been indications of an escape of gas. The occupier of Nos. 53 and 54, whose premises extend right under the road to the other side, became so alarmed at what might be the consequences that he sent yesterday three times to the office of the company and stated his apprehension. The officials, however, would seem not to have regarded the matter as of importance, workmen not being sent to inquire the cause of the escape till between five and six o'clock. The men continued their work till a few minutes to ten, without anything unusual occurring, when one of them, it is believed, struck a flint with the pick he was using. A spark must have followed, for in another moment a loud report announced a great explosion of gas. The causeway in front of the houses already mentioned was torn up for some distance, and the large glass fronts of the two shops were shattered. But the most serious result of the shock was felt in the arches below, which are used as living and stock rooms. The walls of the rooms, the furniture, and the stock were much damaged, the latter being almost a mass of *débris*. In one room part of the stock caught fire, but the flames, fortunately, were speedily extinguished. The police were soon in attendance, and it was through their exertions that the fire was arrested and further injury prevented. The gas continued to burn in the road till about a quarter to eleven. The source of the escape has not been clearly ascertained, but it seems that leading from the main to the premises was an old pipe, which had formerly served the house, though at the present time it was quite unconnected with the meter. In all probability there had been caused by wear or accident a fracture to this pipe, and hence the escape and subsequent explosion. There was no one in the underground rooms at the time, otherwise the consequences might have been far more serious than they actually were.

BOILER INCRUSTATIONS.

The New York Central Railway Company some months since employed Mr. C. F. Chandler, Professor of Analytical Chemistry, Columbia College, New York, to prepare a report on the feed waters used in the locomotives working the line, and the character of the incrustations found within their boilers. The first portion of this report, in a slightly condensed form, we now lay before our readers.

"The following investigations were undertaken with the object of diminishing, as far as possible, the bad effects of the impure water supplied to locomotives on the section of the New York Central Railroad between Syracuse and Rochester. The large quantities of sulphate of lime and of the carbonates of lime and magnesia which these waters contain give rise to incrustations, varying from a loose mud to a hard crystalline scale. These deposits form a non-conducting lining to the boiler, involving loss of heat

and consequent waste of fuel, and at the same time cause an over-heating of the metal, sometimes resulting in destructive explosions. The quantity of incrustation produced varies greatly. As much as 1300 lbs. have been taken from a boiler at one time, though this is an extreme case. The most serious injury from these waters is suffered, however, by the lower plates of the boilers, which are rapidly corroded in deep furrows and pits, and are sometimes even completely perforated, particularly along joints and about braces.

"In planning these investigations it was considered desirable, first, to subject the waters to careful analyses; second, to analyze the incrustations third, to examine the various articles and methods in use for preventing incrustations and corrosion; fifth, to institute a series of experiments on the boilers themselves."

The separate account of the several analyses we omit, as the results are presented in condensed form in the annexed table:—

Composition of Waters now supplied to Locomotives.

Stations.	Corroding Constituents.						Incrusting Constituents.						Incrustration Preventives.		Organic Matter.	Total.
	Ch. of Potassium.	Ch. Sodium.	Ch. of Magnesium.	Sul. Potassa.	Sul. Soda.	Sum.	Sul. of Lime.	Car. of Lime.	Car. Magnesia.	Oxide of Iron.	Silica.	Sum.	Car. Potassa.	Car. of Soda.		
Syracuse, Onondaga Creek	0·32	2·14	..	..	0·98	3·44	10·68	7·25	4·31	0·06	0·28	22·58	..	..	0·34	26·36
Syracuse, Hydrant	0·24	..	..	0·07	0·07	0·38	16·71	6·84	3·09	0·06	0·25	27·55	..	..	trace	27·93
Warner's	1·91	..	..	1·81	..	3·72	..	7·17	3·63	0·11	1·37	11·28	2·17	6·09	0·37	23·63
Memphis	0·29	0·26	..	..	0·36	0·91	10·12	6·75	4·41	0·09	0·31	21·68	..	..	0·18	22·77
Jordan	0·33	0·76	..	..	0·62	1·71	4·02	5·03	2·30	0·03	0·09	11·47	..	..	0·06	13·24
Port Byron	0·39	..	..	0·32	0·37	1·08	0·01	5·43	1·57	trace	0·16	7·17	..	..	1·28	9·53
Savannah	0·59	..	..	0·07	0·69	1·35	..	11·93	5·94	0·10	0·56	17·63	..	..	1·52	20·50
Clyde, Spring	0·14	..	..	0·18	0·45	0·77	..	9·66	4·40	trace	0·58	14·64	..	..	2·16	17·58
Clyde River	0·52	0·37	..	..	1·21	2·10	4·40	6·07	3·03	trace	0·80	14·30	..	..	1·88	18·28
Lyons	0·29	..	..	0·03	0·71	1·03	3·17	4·38	3·34	trace	0·18	11·07	..	..	1·00	13·10
Newark	0·47	0·38	..	..	0·32	1·17	3·19	9·15	6·01	0·08	0·30	18·73	..	..	2·16	22·07
Palmyra	0·76	..	..	..	0·67	1·43	18·81	8·41	5·98	0·02	0·17	33·39	..	..	1·46	37·28
Macedon Swamp	0·14	..	..	0·18	0·39	0·71	0·14	7·68	2·23	trace	0·48	10·53	..	..	0·80	12·04
Fairport	0·34	0·69	2·16	..	..	3·19	8·72	5·07	1·03	0·04	0·20	15·06	..	..	1·14	19·39
Rochester—																
North Street well	0·96	4·82	1·53	..	..	7·31	6·46	16·92	8·88	0·10	0·90	33·26	..	..	1·69	42·17
Genesee River	0·28	0·05	..	..	0·85	1·18	3·16	4·64	2·06	0·09	0·90	10·85	..	..	1·64	13·67
Canal, Round House	0·33	0·17	..	..	0·61	1·11	2·16	4·60	1·84	0·05	0·18	8·80	..	..	1·24	11·15
Average	0·49	0·57	0·22	0·16	0·49	1·93	5·39	7·47	3·75	0·05	0·39	17·05	0·13	0·36	1·10	20·57

[The numbers represent grains per gallon of 231 cubic inches.]

It appears from the foregoing table that the average composition of water is:—

Corroding constituents			1·93
Incrusting constituents	Sulphate of lime	5·39 grs.	
	Carbonate of lime, Carbonate of magnesia, Oxide of iron and silica	11·66 „	17·05
Organic matter			1·10
Incrustation preventives			0·49
Total per gallon			20·57

It was considered desirable to analyze a sufficient number of incrustation to determine with certainty their prevailing character. Although the analyses of the waters gave a tolerably good idea of the composition of the deposits, and made it certain that the chief constituents must be carbonate of lime, carbonate of magnesia, and sulphate of lime, a knowledge of the average proportions of these different constituents was essential to the proper selection of remedies, as the carbonates and sulphates require different reagents for their solution. Ten incrustations were therefore selected; six of them as fair average representatives of the usual deposits, and four as exceptional varieties.

The results of the analyses are tabulated, as follows:—

Analyses of Boiler Incrustations.

Source.	Structure.	Thickness.	Sulphate of Lime.	Carbonate of Lime.	Basic Carbonate of Magnesia.	Oxide of Iron and Aluminium.	Water.	Organic Matter.	Silica.	Total.	——
1. Stationary engine, boiler-shop. Syracuse: hydrant water	Compact and crystalline.	3/16ths in.	74·07	14·78	9·19	0·08	1·14	undet.	0·65	99·91	
2. Stationary engine, machine-shop. Rochester: canal water, 10 mos.; well water, 2 mos.	„	2 in.	71·37	..	..	26·87	..	..	1·76	100·00	Fair average representatives of the usual incrustations.
3. Locomotive No. 211. Freight both roads. Syracuse	„	1/32nd in.	62·86	12·62	18·95	0·92	1·28	undet.	2·60	99·23	
4. Locomotive: surrounding a brace	„	1/4th to 1/3rd in.	53·05	..	..	42·16	..	..	4·79	100·00	
5. Locomotive No. 127. Freight both roads. Syracuse	„	1/32nd in.	46·83	..	..	47·85	..	..	5·32	100·00	
6. Locomotive No. 202. Freight both roads. Syracuse	„	1/4th in.	30·80	26·93	31·17	1·08	2·44	undet.	7·75	100·17	
Average	..	..	56·49	18·11	19·77	0·69	1·62	undet.	3·81	..	——
7. Stationary engine. Niagara Falls: river water	Friable & granular.	2 in.	4·95	86·25	2·71	1·03	0·63	undet.	2·07	97·54	
8. Stationary engine. Townsend's furnace, Albany	„	1½ in.	0·88	93·19	2·84	0·36	0·15	1·96	0·62	100·00	Exceptional incrustations, the only ones of their kind.
9. Locomotive No. 122. Rochester to Buffalo	Powder.	..	4·81	..	..	92·27	..	..	2·92	100·00	
10. Stationary engine. Barhydt and Greenhalgh, Schenectady	„	..	30·07	..	..	61·69	..	..	8·24	100·00	

The incrustations appear to be of three kinds:—

1. Hard, compact and crystalline, formed of numerous thin layers, and consisting of from 30 to 75 per cent. of sulphate of lime, associated with carbonate of lime, basic carbonate of magnesia (2 MgO, CO_2), &c.

The average composition of the six specimens analyzed was:—

Sulphate of lime	56·49
Carbonate of lime	18·11
Basic carbonate of magnesia	19·77
Oxide of iron and alumina	0·69
Silica	3·81
Organic matter	undet.
Water	1·62
	100 00

With a single exception all the locomotive incrustations were of this character, as were also most of those from stationary boilers. The incrustations from marine boilers belong to this class, consisting almost entirely of sulphate of lime.

2. Loose and friable, not at all crystalline; in thick masses, not in well-defined layers, composed chiefly of carbonate of lime. Only two specimens of this variety were met with, both from stationary boilers. They are evidently deposited from water containing very little sulphate of lime.

3. Consisting of a fine powder or mud. Noticed in only two instances; in one case in a locomotive, in the other in a stationary boiler. In composition the two specimens differ, one consisting chiefly of carbonate of lime and magnesia, the other containing 30 per cent. of sulphate of lime.

The Formation of Incrustations.

The analyses presented in the tables already published show that the incrustations consist chiefly of the carbonates of lime and magnesia and the sulphate of lime. The two carbonates are insoluble in pure water, and owe their presence in the waters of springs and rivers to free carbonic acid, which forms with them soluble bicarbonates.

When such waters are boiled this carbonic acid is expelled, and the carbonates of lime and magnesia separate in the form of insoluble powders, portions of which adhere to the sides of the vessel containing the water.

The carbonic acid, acting as a solvent, is so loosely combined with the carbonates that exposure to the air is sufficient to cause the separation of a portion of it, an equivalent quantity of the insoluble carbonates separating as a deposit, as already mentioned in connexion with the Weedsport waters.

The more slowly the carbonates are precipitated from their solution in carbonic acid the more compact are the deposits, and the more firmly do they adhere to the surface with which they come in contact. In caverns, by slow evaporation, hard, stony stalactites and stalagmites are formed; while in boilers, unless sulphate of lime be present in considerable quantity, the deposits consist usually of a fine loose powder or mud.

Various alkaline substances, by appropriating this carbonic acid, cause the precipitation of the insoluble carbonates. Potash, soda, and ammonia, as well as their carbonates, produce this effect, as does also lime water. In the latter case, the lime added, unless an excess be used, is also deposited as carbonate; consequently, no alkaline salts are substituted for the carbonate removed, as in the case when the other substances are employed.

It is seen from the above that the carbonates may be removed without decomposition by simply depriving them of their solvent—the carbonic acid.

The sulphate of lime is soluble in water, one part of the sulphate requiring about 400 parts of water for its solution. One gallon of water is capable of holding about 150 grains of sulphate of lime. The solubility of sulphate of lime in water is modified by the presence of other substances. The chlorides of calcium and magnesium, alcohol, &c., and even a high temperature, diminish, while the chlorides of sodium and ammonium, sugar, and various other organic substances, somewhat increase its solubility. Hyposulphite of soda is said to increase its solubility tenfold. Above 212° Fahr. the solubility rapidly diminishes as the temperature increases. At 255° Fahr., equivalent to a pressure of 30 lbs., its solubility is diminished nearly three-fourths; at 272° Fahr., equivalent to a pressure of 45 lbs., nineteen-twentieths; and at a temperature of 280° to 300°, it may be said to be totally insoluble.

The following analyses of waters taken from boilers are interesting in this connexion:—

	1. No. 101.	2. No. 106.	3. No. 113.	4. Stationary Machine Shop, Syracuse.
Distance run	700 miles.	416 miles.	416 miles.	
Road	direct.	Auburn.	Auburn.	
Preventive used	bran.	bran, two buckets.	nothing.	Potatoes, one peck.
Reaction	neutral.	neutral.	neutral.	alkaline.
Sulphate of lime	17·88 grs.*	9·53 grs.*	39·89 grs.*	49·82 grs.*
Carbonate of lime and magnesia	trace.	trace.	trace.	trace.
Chlorides, &c.	56·76 grs.	19·38 grs.	52·95 grs.	37·42 grs.
Organic matter	9·33 „	8·86 „	13·99 „	12·59 „
Nitrates	trace.	...	trace.	faint trace.
Total per gallon	83·97 grs.	37·77 grs.	106·83 grs.	99·83 grs.

* These figures are probably too high, as they are calculated from the sulphuric acid, a portion of which probably exists in the form of alkaline sulphates.

No. 106 had run for eight months, and was very clean. The water from the stationary was turbid, depositing, on standing, a sediment containing sulphate of lime, carbonates of lime and magnesia, oxide of iron, clay, &c. The small quantities of sulphate of lime and of carbonates of lime and magnesia contained in these waters, confirm the statements already made with regard to the effect of heat on the solubility of these substances.

Sulphate of lime does not, therefore, require the presence of carbonic acid for its solution. It is deposited in boilers on account of the high temperature and its limited solubility, and forms, in the absence of the carbonates, as in marine boilers, a hard crystalline scale, sometimes an inch or more in thickness. When the carbonates of lime and magnesia are present the deposits vary from a loose powder to a hard, crystalline incrustation, according to the relative proportions of the three substances.

THE GAS-WORKS OF NEWTON ABBOT.—In consequence of the vastly increasing size of the town, and the extra consumption of gas, it has been found necessary to make extensive alterations at the works. A contract has been entered into with a builder in the town to the extent of nearly £1000, to perform that portion of it in connexion with his business.

SECOND ANNIVERSARY OF THE LIGHTING OF PARÀ WITH GAS.—On Saturday, the 12th of May, being the second anniversary of the lighting with gas of this city, his excellency the president of the province, the president of the provincial Legislature, and about sixty others of the principal inhabitants, visited the works, and were entertained to breakfast in the residence of Mr. Wilson, the agent of the company. The proceedings altogether passed off in the most agreeable manner; and in the course of the day, his excellency, in proposing success to the company coupled with the healths of the directors and of Mr. Wilson, characterized the works as excellent in design and construction, and expressed satisfaction at the regularity with which the lighting had been conducted during the two years of its operation. Parà, situated on the Parà River, one of the mouths of the Amazon, is the sole *entrepôt* of that immense region, and must in the course of time become of considerable importance; its present population (which, however, is rapidly increasing) is about 35,000. Gas since its introduction has considerably enlivened the dulness of the place. The streets are lighted with 760 public lamps, and the company have already secured about 450 private consumers, the consumption of the smallest of which is worth £6 annually. There still remains space for about 400 additional public lamps, the order for which it is expected will not be long delayed. The cathedral (a magnificent building) has been lighted with about 250 jets in the shape of small stars, and the bishop has approved of what is supposed to be an unprecedented innovation in the form of two tripod pillars having gas imitation candles instead of composite placed amongst the others beside a life-size image of the Virgin; the effect is so brilliant that the priests are delighted, and are debating whether to replace all the candles by gas-jets in similar cases.

Share List of Metropolitan Gas Companies.

No. of Shares issued.	Amount per share.	Name of Company.	Amount paid up per Share.	Div. per Cent. per Annum.	Price per Share.
	£		£ s d	£ s d	£ s d
5000	10	Anglo-Romano	10 0 0	9 0 0	11 to 13
5000	20	Bahia (Limited)	20 0 0	4 0 0	16 10 0
1000	20	Do., preference	20 0 0	10 0 0	27 10 0
750	20	Do., do., redeem.	10 0 0	10 0 0	12 10 0
30000	5	Bombay (Limited)	5 0 0	£5 intr.	4 5 0
10000	5	Do., third issue	4 0 0	£5 intr.	3 5 0
10000	20	British, Limited (Norwich, Hull, Sculcoates, Hanley, Tunstall & Shelton (Potteries), Trowbridge, & Holywell.)	20 0 0	10 0 0	29⅜ to 29½
12000	50	*Chartered*	50 0 0	10 0 0	63¼ to 64
6000	50	Do.	35 0 0	10 0 0	42 to 42½
10000	20	*C. of London*, Ash.	20 0 0	10 0 0	26 to 28
10000	10	Do., B shares	10 0 0	4 0 0	7 to 7¼
8000	10	Do., new shares	10 0 0	10 0 0	13 to 14
25000	25	City of Moscow (L)	12 10 0	£7 intr.	4¼ to 6¼
17490	25	Colonial & General *Commercial*	25 0 0	10 0 0	36 to 37
5000	20	Continental G. & W.	6 0 0	6 0 0	
2500	20	Continental Union.	20 0 0	8 0 0	17 to 18
17500	20	Do.	10 0 0	8 0 0	8 to 9
5827	5	County & Gen. (L)	5 0 0		
2000	5	Do., preference (Pater, Pembroke, Ely, Lea Bridge, Northfleet, Walton, & Ware.)	5 0 0		
5000	10	*Crystal Pal. Dist.*	10 0 0	10 0 0	14¼ to 15
5000	10	Do.	1 0 0	7 0 0	1 7 6
100 00	10	Do., preference	10 0 0	6 0 0	12½ to 13
4000	50	*Equitable*	50 0 0	10 0 0	73 0 0
4000	25	Do., new shares	25 0 0	10 0 0	30 to 37
23406	10	European (Lim.)	10 0 0	10 0 0	12½ to 12¾
12000	10	Do., new shares (Boulogne, Amiens, Rouen, Caen, Havre, & Nantes.)	5 0 0	10 0 0	6¼ to 6¾
20000	10	*Great Central Gas Consumers*	10 0 0	10 0 0	12½ to 13
5000	10	Hong Kong (Lim.)	10 0 0		8 to 10
26000	50	*Imperial*, old sh.	50 0 0	10 0 0	74 to 75
1300	100	Do., bonds	£100	10 0 0	197 to 198
7000	25	Imperial Austrian	10 0 0		
28000	50	*Impl. Continental* (Amsterdam, Berlin, Ghent, Hanover, Lille, Rotterdam, Aix-la-Chapelle, Antwp., Bordeaux, Brussels, Cologne, Frankfort-on-M., Haarlem, Stolberg, Toulouse, & Vienna	43 15 0	16 0 0	88 to 90
3000	40	*Independent*	40 0 0	10 0 0	60 to 65
3000	10	Do.	10 0 0	5 0 0	8 to 9
3000	20	Do.	10 0 0	7 10 0	11 to 13
6886	50	*London*	50 0 0	10 0 0	68¼ to 69½
5519	25	Do., 1st pref.	25 0 0	6 0 0	28 to 29
568	50	Do., 2nd pref.	50 0 0	6 0 0	
219	50	Do., 3rd pref.	50 0 0	6 0 0	
18781 *l*		Do., 1st pref. sk		6 0 0	
11828 *l*		Do., 2nd pref. sk		5 0 0	
12000	5	Malta & Medit. (L.)	5 0 0	3 0 0	
39000	5	Oriental, Calcutta	5 0 0	8 0 0	4¾ to 5¼
30000	5	Do., new shares	0 10 0	8 0 0	⅝ to ¾
16000	5	Ottoman (Limited)	5 0 0		2 to 4
10000	10	Parà (Limited)	10 0 0	£6 intr.	9¼ to 9½
27000	20	*Phœnix*	20 0 0	10 0 0	25¼ to 26
3600	100	Do., new	15 0 0	7 10 0	15 0 0
144000	Sk.	Do. (capit. profits)		5 0 0	80 0 0
5000	20	*Ratcliff*	20 0 0	10 0 0	28 to 30
20000	10	Rio de Janeiro (L.)	20 0 0	10 0 0	20¼ to 21½
6959	5	Singapore (Lim.)	5 0 0	3 0 0	
2000	5	Do., preference	5 0 0	7 10 0	
4800	50	Shanghai *Sth. Metropolitan*	50 0 0	10 0 0	76 to 78
15000	10	*Surrey Consumers*	10 0 0	10 0 0	13¾ to 14
10000	10	Do., new	5 0 0	10 0 0	6 to 6½
9000	50	United General (Dublin & Limerick)	50 0 0	4 12 0	29 to 31
10000	10	*Victoria Docks*			
3000	10	*Wandsworth & Putney*	10 0 0	7 10 0	13¼ to 14
20000	10	Western (Limited) A shares.	10 0 0	10 0 0	14¼ to 14½
10000	10	Do., B shares.	5 0 0	10 0 0	8½ to 9
10000	10	Do., C shares.	3 0 0	10 0 0	5½ to 6
20000	10	Do., D shares.	1 0 0		1¼ to 2
8000	5	*West Ham*	5 0 0	7 10 0	6 10 0
6000	5	Do., new shares	3 0 0	7 10 0	3 18 0
551	10	West London Junction (Lim.)	10 0 0	6 0 0	
520	10	Do., preference	10 0 0	6 0 0	

Price Current.

CASTINGS.—*Per Ton.*

Average Weight of Cast-iron Gas-pipes, per Yard.

1¼ in.	2 in.	2½ in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lb

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow.	Newcastle	Wales.	Yorkshire, Derbyshire, and Staffordshire.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Pig Iron, No. 1, G.M.B.	3 15 0	2 13 0	2 12 6	3 10 0	4 0 0
1¼ and 2-inch Socket-pipes	7 10 0	6 0 0	6 15 0	6 15 0	7 10 0
2½ and 3-inch ditto	7 0 0	6 0 0	6 5 0	6 10 0	7 0 0
4 and 5-inch ditto	6 10 0	5 10 0	5 15 0	6 0 0	6 10 0
6 inches and upwards ditto	6 5 0	5 0 0	5 10 0	5 15 0	6 5 0
Retorts, 1st fusion, hot blast	6 0 0	—	5 5 0	5 10 0	6 0 0
Ditto, 2nd ditto, cold ditto	7 0 0	5 15 0	6 0 0	6 0 0	7 0 0
Tank-plates, ¼ thick and above	6 10 0	5 10 0	5 10 0	5 15 0	6 5 0

WROUGHT-IRON TUBING,

Subject to 50 per cent. Discount.

	2 in.	1½ in.	1¼ in.	1 in.	¾ in.	½ in.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent Welded Tubes, from 2 to 12 feet—per foot	1 0	0 10	0 7	0 5	0 4½	
Ditto ditto, from 6 inches to 18 inches—each	3 0	2 0	1 9	1 3	1 0	0 9
Connecting-pieces, or Long Screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, Springs, and Elbows (wrought iron)	3 9	2 3	1 9	1 0	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, ditto	4 6	3 0	2 6	2 0	1 6	1 2
Iron Cocks	17 6	9 6	7 6	4 6	3 3	2 6
Ditto, with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing Sockets, Caps, Plugs, and Nipples	1 3	0 9	0 8	0 6	0 5	0 4
Plain Sockets	1 0	0 8	0 7	0 5	0 4	0 3
Syphons, 3-quart	18 0	14 0	13 6	13 0	12 0	—

GAS COALS.—*Per Ton.*

Newcastle.—Unscreened:—

East Castle, Haswells, Nettlesworth Primrose, and South Pelaw	6s. 6d.
Felling, North Pelton, Redheugh Main, Walker's Primrose, West Wear, and Whitwell Primrose	6 9
Burnhope, Craghead, Charlaw, Derwent, Edmondsley, Eighton Moor, Hartlepool Pelaw, Holmside, Lambton's Gas, Lanchester Pelaw, Medomsley, Mickley, New Pelaw, New Pelton, Pelaw Main, Ravensworth, South Moor Pelton, South Leverson, Townley Main, Tyne Main, West Pelaw, Wearmouth Hutton, and Witton	7 0
Peareth, Ravensworth Pelaw, Waldridge, West Garesfield, and West Pelton	7 3
Brancepeth, Dean's Primrose, Pelton, South Peareth, Stella, Urpeth, Washington Hutton, and West Leverson	7 6
Ramsay's Newcastle Cannel	20 0
Wigan Cannel (at Liverpool)	17 0
Scotch Cannel:—	
Boghead (at Leith)	80 0
Kirkness, best	28 6
Capeldrae, 1st quality	28 6
Ditto, 2nd ditto	18 6
Lesmahago (at Glasgow)	29 0
Ditto (at Granton)	30 0
Arniston	27 6
Wemyss	20 0
Haywood, Wilsontown (at Granton)	18 0
Pirnie	14 0
Lothian's Cannel (at Leith)	25 0
Myles' Cannel	21 0

FREIGHTS.

Coastwise—Newcastle.—Per Ton:—

Chatham and Rochester	5s. 9d
Cork	8s. 6d. to 8 9
Dover, Folkestone, and Ramsgate	7 6
Dublin	9s. 0d. to 9 6
Exeter Quay	8 0
Ipswich	5 6
London (from Leith)	8 0
London (Pool)	6 0
Lowestoft and Yarmouth	4 6
Portsmouth & Southampton	7 0
Plymouth	7 3
Shoreham	6 6
Whitstable	6 3
Weymouth	7 6
Foreign.—Per Keel:—	
Barcelona	24 0
Bordeaux	14 0
Boulogne and Calais	7 10
Cadiz	17 0
Cronstadt	—
Copenhagen	£8 0s. to 8 7 6
Genoa	25 0
Hamburg	8 0
Havre de Grace	9 10
Leghorn	25 0
Lisbon	16 0
Rotterdam	7 10
Stettin	9 10
Trieste	—
Venice	—

SUNDRIES.

Best Nstle. Fire-bks., p. 1000, £2 10s. to £2	15 0
Cliff's Fire-bks. (at Wortley), p. 1000.	2 15 0
Ingham's ditto (at Wortley), p. 1000..	2 15 0
Fire-clay Retorts, p. ft. run, 5s. 6d. to	0 7 0
Tough Cake Copper, p. ton	86 0 0
English Pig Lead, p. ton	20 0 0
Welsh Bar Iron (in London), p. ton..	7 2 6
Foreign Spelter, p. ton	23 0 0
English Block Tin, p. ton	88 0 0
Banca, p. ton	78 0 0
Tarred Rope Yarn, p. cwt.	1 0 0

TO GAS COMPANIES.

WANTED, by the Advertiser, who has a complete knowledge of all gas matters, the LEASE of a GAS-WORK. A good dividend, cheap gas, and improved works will be the result.

Address, BURFORD, care of Mr. Sheeds, the Station Lodge, Sydenham Hill, DULWICH.

WANTED, by the Advertiser, a situation as FOREMAN or MANAGER of a small Gas-Work. He has a good knowledge of gas-making and the erection of gas-works, laying of mains and services, &c. Was four years in one of the London gas-works, and can furnish satisfactory testimonials.

Address, A. B., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, an efficient Fitter and METER REPAIRER, both wet and dry.

Apply, stating wages required, with references, to the MANAGER, Gas Office, FALMOUTH.

TO TAR DISTILLERS, &c.

THE Gas Committee of the Middles- brough Local Board are prepared to receive TENDERS for the TAR made on their Works for the ensuing twelve months.

The tenders to state price per ton, either F. O. B. or F. O. Rails, in purchaser's casks or tanks at Middlesbrough; and to be delivered to the undersigned not later than July 31, 1866.

By order of Gas Committee,
JOHN DUNNING, Manager.

IMPERIAL CONTINENTAL GAS ASSOCIATION.

The HALF-YEARLY MEETING of the Imperial Continental Gas Association was held at the London Tavern, Bishopsgate Street Within, yesterday, the 28th of May, when the following resolutions were passed:—

Resolved—"That the Report upon the affairs of the Association now read be received, and entered on the minutes."

Resolved unanimously—"That a Dividend of £2 10s. per share, and a Bonus of £1 per share, be declared upon the 28,000 shares of the Association, for the half year ending the 31st of December last, and that the said Dividend and Bonus be payable, free of income-tax, on and after the 15th of June next."

Resolved unanimously,

"That Philip Twells, Esq., be re-elected a Director of this Association."

"That James Helme, Esq., be re-elected a Director of this Association."

"That Henry Wood, Esq., be re-elected a Director of this Association," and

"That Joseph Sebag, Esq., be re-elected an Auditor of this Association."

"That the cordial thanks of the Meeting be given to the President and Directors for their able management of the affairs of the Association, and to the Chairman for his conduct in the chair this day."

By order of the Board of Direction,
(Signed) W. WALTON, Secretary.
30, Clement's Lane, Lombard Street,
London, May 29, 1866.

EDMUND SMITH,
GRASBROOK, HAMBURG,

would respectfully call the attention of engineers and managers of gas-works to his Newly Improved GAS-METER, patented 1862 in England, and the principal parts of the Continent.

Price-lists and tenders for gas-meters, experimental station-meters, experimental holders, governors, purifiers, gasholders, pressure-gauges, gas and water fittings, &c., are forwarded on application.

SAMUEL CUTLER, Gasholder MAKER and CONTRACTOR

For Tanks, Roofs, Purifiers, Condensers, Erection and Alteration of Works and every description of GAS APPARATUS.

PROVIDENCE IRON WORKS,
MILL WALL, POPLAR. LONDON, E.
Main Laying and Gas-Works erected complete.

TENDERS FOR COALS.

THE Derby Gaslight and Coke Com- pany are desirous to receive Offers for the supply of 15,000 tons of Soft Coals and Soft Cobbles or Nuts, for the year terminating on the 30th day of June, 1867, to be divided into two contracts of 9500 tons, and 5500 tons respectively; and to be delivered in the following monthly quantities, viz.:—

		Tons.		Tons.
1866	July	400	. .	200
	August	1000	. .	500
	September	1100	. .	700
	October	1100	. .	700
	November	1100	. .	700
	December	1100	. .	700
1867	January	1100	. .	700
	February	1100	. .	600
	March	700	. .	300
	April	400	. .	200
	May	200	. .	100
	June	200	. .	100
	Total,	9500	. .	5500

The Company will undertake to receive from the party or parties contracting, the above quantities of 9500 or 5500 tons respectively, or the total quantity of 15,000 tons as the Board may decide; but they do not bind themselves to accept the lowest or other tender or tenders, until after a satisfactory trial of the coals and cobbles or nuts, to which such tender or tenders may relate shall have been made. They are to be the best of their kind, and as free as possible from sulphur, bats, bind, refuse, and dirt, and shall be weighed upon a correctly adjusted machine.

Payments will be made monthly, if, and so long as the contracts shall be duly fulfilled, to the extent of nine-tenths of the amount of the invoices, and the balance will be discharged on the satisfactory completion of the contract.

Sealed tenders (to be made on forms obtainable at the Company's Office) specifying the description of coals and the pits at which they are to be raised, and stating the prices for delivery by canal at Derby at the new Gas-Works adjoining the Midland Railway Company's workshops, or at the canal wharf, and also the price delivered at the Midland Railway stations, Derby, viz.:—9500 tons at the City Road Station, and 5500 tons at the London Road Bridge Station—and in manner and subject to the conditions aforesaid, must be delivered at the Offices of the Company, Friar Gate, on or before Saturday, the 30th day of June inst.

The respective contracting parties will be required to execute an agreement to be prepared by and to the satisfaction of the Solicitor of the Company.

By order of the Directors,
ISAAC FISHER, Secretary.
Derby Gas Office, June 12, 1866.

B. CARPENTER'S Improved Wood SIEVES for Gas-Purifiers.

Works: 14, John Street, Pentonville Road, LONDON, N.

The above sieves are used by the principal gas companies in London and the country. Their utility, durability, and cheapness combined, render them superior to all others.

Testimonials from gas engineers who have tested their qualities forwarded on application.

All orders punctually attended to, and estimates given if required.

MR. G. W. STEVENSON, C.E., F.G.S., (for the last 10 years Engineer to the Corporation of Halifax), may be consulted upon all matters connected with the construction of gas-works, and the manufacture and supply of gas; also upon the construction of water-works and the supply of water to towns; and also in respect to the sewerage of towns, and sanitary works generally.

Offices, Waterhouse Street, HALIFAX, and 14, Park Street, WESTMINSTER.

CAST-IRON Retorts, Socket Pipes, with Syphons and all requisite Connexions, Lamp Columns, Wrought Iron Tubing, Valves, Street Lamps, Sight Holes, Furnace Doors, Ash Pans, Charging and Coke Shovels, Iron Pails and Coke Barrows, Cross Bars, Fire Pots, Pumps, Iron Borings.

PURIFIERS, CONDENSERS, and SCRUBBERS erected complete, or the materials supplied; with every description of goods in use by Gas-Works, in stock, on wholesale prices, at

Mr. LYNCH WHITE'S,
Old Barge Iron Wharf, Upper Ground Street,
LONDON.

GOVERNOR.

TO BE SOLD cheap, a 9-in. Governor, in consequence of having substituted a larger.

May be inspected, and particulars known, on application at the Sutton, Southcoates, and Drypool Gas-Works, Sitwell Street, Groves.

F. W. OLDFIELD,
Secretary and Manager.
Hull, June 14, 1866.

TO BE SOLD, for 1, 2, or 3 Years from the 25th day of July next, the TAR produced at the Guildford Gas-Works.

Tenders to be addressed to the Manager,
JOSH. SHAW.

CRYSTAL PALACE DISTRICT GAS COMPANY.

FOR SALE, 2 6-Horse Steam-Engines and 2 Beale's EXHAUSTERS, to pass 20,000 cubic feet per hour, with the necessary shafting, pulleys, &c., complete.

Can be inspected, and any information obtained, on application to Mr. E. S. Cathels, the Engineer and Manager, at the Company's Works, Lower Sydenham.

By order of the Board,
MAGNUS OHREN, Secretary.

TO GAS COMPANIES AND ENGINEERS.

TO be Disposed of, by the Falmouth Gas, Coal, and Coke Company, Limited, a Cast-Iron GASOMETER-TANK, 45 ft. diameter by 14 ft. deep, in excellent condition—estimated weight about 78 tons; together with the bolts and nuts, belt-hoops, &c., belonging thereto. Now lying at Penryn, very convenient for shipment or delivery by railway.

Also with the above, or separately, the Framing and Angle Iron Curbs for a telescope gasholder to suit the above tank. Also the pulleys, chains, guide-wheels, bars, &c.

Application to be made to Mr. W. WARN, Secretary to the Company, Falmouth, Cornwall.

Dated Falmouth, June 23, 1866.

FOR SALE:—1 4-in. Vertical Con- denser.

2 Dry-Lime Purifiers, 10 ft. by 5 ft. by 4 ft. 6 in. deep.

1 Station-Meter, in circular cast-iron case, 3 ft. 6 in. by 3 ft. 6 in.

1 Governor, capable of passing 3000 cubic feet per hour.

The whole of the above, with connexions, by-pass, &c., in excellent condition, are to be disposed of in consequence of extensions.

All other particulars to be had on application to the MANAGER, Gas-Works, Aylesbury, BUCKS.

FOR SALE, a Set of second-hand CONDENSING PIPES, with boxes, suitable for a small Gas-Work. Diameter of drain, 6 in. Cheap.

Apply, G., at J. Steen, late Simpson and Steen, WOLVERHAMPTON.

ON SALE, an Exhauster, nearly new, 3-ft. stroke, to pass 20,000 feet per hour, with two screw-valves, by-pass, and all connexions. Also one high-pressure 4-horse STEAM-ENGINE (by Chadwick, of Manchester), 12-in. stroke. To be sold together or separately.

For particulars and price apply to J. KELSALL, Gas-Works, ASHTON-UNDER-LYNE.

June 6, 1866.

FOR SALE, a 6-in. Centre Valve, complete, nearly new; 2 9-ft. lengths of 12-in. Hydraulic Main; 12 3-in. H and Dip Pipes; Hydraulic Valve, with 4-in. connexions, for two purifiers; 4 cast-iron Columns for 8 ft. deep gasholder. Sold on account of enlargement of works.

Apply to Mr. J. H. MASON, NEWBURY.

PRECIPITATED OXIDE OF IRON, prepared by the process as patented by Mr. HILLS.

Manufactured by
ARTHUR WARNER,
17, LAURENCE POUNTNEY LANE, LONDON, E.C.

THE

GAS-METER COMPANY, LIMITED,

(LATE CROLL, RAIT, & CO.,)

Beg to intimate that the printed report of the official inspector of Gas-Meters for the City of Manchester for the year ending **1864** shows the following comparison:—

NEW METERS TESTED.

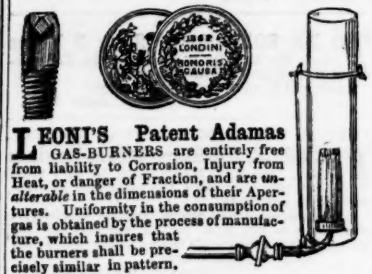
Of the Gas-Meter Company, Limited	Dry	1116	
	Wet*	1292	
Total			2408
Of George Glover and Co.	Dry		383

* The Unvarying Water-Line Gas-Meter, in regard to which the following extract from said report refers:—"The visiting justices will perceive, from a comparison of the tables now appended with those of last year (viz., 1863), *that there has been a large increase in the number of new wet meters tested, owing to the Gas Committee having substituted the wet for the dry in the case of hired meters.*"

Extract from printed report of the said official inspector for the year ending 1862, shows the following comparison:—

Croll, Rait, and Co., per centage of error on the number tested	**8·671**
George Glover and Co. " " "	**22·727**

NATURAL
HYDRATED OXIDE of IRON
constantly on Sale. Apply to
MARTYN DENNIS AND CO.,
LIVERPOOL.



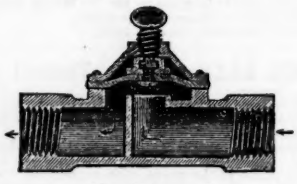
LEONI'S Patent Adamas GAS-BURNERS are entirely free from liability to Corrosion, Injury from Heat, or danger of Fraction, and are *unalterable* in the dimensions of their Apertures. Uniformity in the consumption of gas is obtained by the process of manufacture, which insures that the burners shall be precisely similar in pattern.

Net Cash Price, 8s. per gross.

Patentee and Sole Manufacturer, S. LEONI, 34, St. Paul Street, New North Road, LONDON, N.

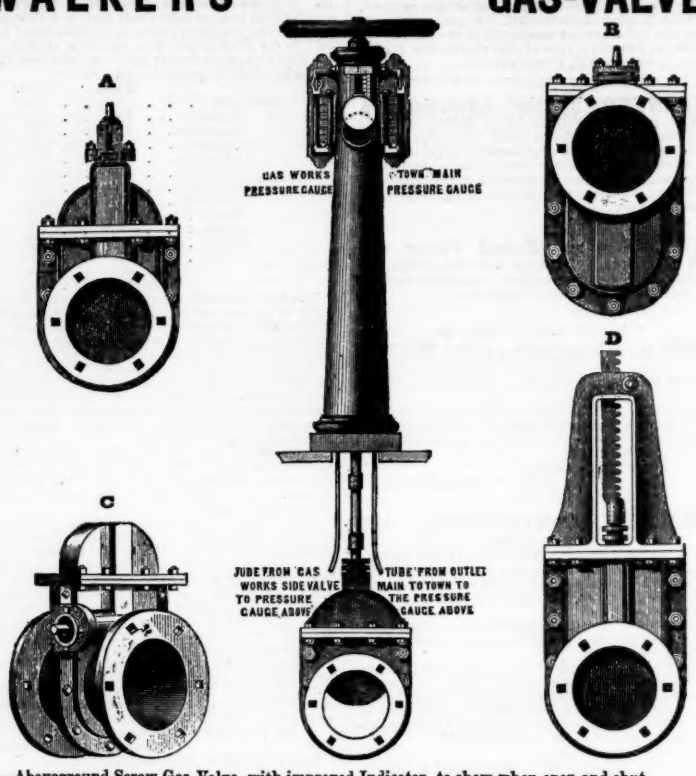
THOMAS LAMBERT & SON,
SHORT STREET, LAMBETH, LONDON.

CARTER'S SAFETY GAS-VALVES,
Made to suit every Description of Fittings.
Section of Valve open.



Manufacturers of
WROUGHT-IRON PIPES AND FITTINGS,
SLUICE-VALVES AND STOP-COCKS,
STOCKS, TAPS, & DIES,
CHANDELIERS, PENDANTS, &c.
PATENT MERCURIAL GAS-REGULATORS.

WALKERS **GAS-VALVES.**



A—Aboveground Screw Gas-Valve, with improved Indicator, to show when open and shut.
B—Underground Screw Gas-Valve, for shallow Street-Mains, made with or without an Indicator.
C—Internal Rack-Valve, with wrought-iron Pinions and machine-cut Teeth.
D—Ordinary Rack and Pinion-Valve, with strong, undamageable Racks and Pinions—made as shown, or boxed up for Street-Mains.
E—Regulating Indicating Column and Valve, for governing the supply of Gas to the Town.

LITTLE SUTTON STREET, LONDON, E.C.

EDWARD COCKEY & SONS,
IRON-WORKS, FROME SELWOOD,
PATENT GAS-VALVES.
A PRIZE MEDAL

WAS AWARDED TO THE PATENTEES AT THE INTERNATIONAL EXHIBITION OF 1862.

These Valves are formed of two cylinders, working one on the other horizontally, having their faces ground perfectly gas-tight.

They are adapted either as central valves, for two, three, or four purifiers—as bye-passes—or as inlet and outlet-valves for gasholders.

They have been fixed in some of the most important Gas-Works in the Kingdom, for more than eight years. Considerably over two hundred of them are now in use, and the most satisfactory reports of their advantages continue to be received. They are simple in construction, and not liable to get out of repair, and if in course of time the faces should leak, they can be easily re-ground and made as tight as ever, without removal from their positions. Each Valve is fitted with an index, which shows to the person in charge of the Works in what direction the gas is passing.

Frome, January 20, 1866.

TO CORPORATIONS, GAS ENGINEERS, AND OTHERS.

HENRY ALDER,
GRANGE METER-WORKS, EDINBURGH,

Begs to intimate that he has introduced the manufacture of DRY GAS-METERS in

CAST-IRON CASES.

These Meters are protected by registration under the "Copyright of Designs Act." They are much more durable, and at the same time more easily repaired than those in Tin Cases.

Price list and terms on application.

GAS & GENERAL ENGINEERING OFFICES,
53 FREDERICK STREET, EDINBURGH.

MR. JOHN ROMANS, Civil and Practical Engineer, may be consulted at the above address on all matters pertaining to Gas-Works, Water-Works, and other Engineering questions.

Plans and Specifications Furnished, Works Erected and Repaired, or taken on Lease for a term of years.

Mr. Romans is also agent in Edinburgh for supplying High-Classed Scottish Cannel Coal and Fire-Clay Goods.

FRASER'S PATENT RIBBED CAST-IRON RETORTS are being introduced at the Gas-Works, Derby, Shrewsbury, Portsea, Nottingham, Syston, Whitwick, Barrow-in-Furness, Seaham, Risborough, Leighton, Loughborough, Corwen, Castle Donnington, Kegworth, Royston, Woking, Swadlincote, Rugby, Carlow in Ireland, Stornoway, N.B.; also at Gibraltar and Montreal, &c.

Apply to Mr. A. C. FRASER, Gas-Works, COLCHESTER.

OXIDE OF IRON,
We are prepared to supply, on moderate terms,
HYDRATED PEROXIDE OF IRON (BOG OCHRE),
Same quality as supplied by us to several of the most extensive Gas Companies, and which has given entire satisfaction.

FRANCIS RITCHIE & SONS,
BELFAST.

INTERNATIONAL EXHIBITION,
1862. CLASS X.
PRIZE MEDAL
For excellence of Fire-Clay Gas Retorts, and "HONOURABLE MENTION" for good quality of Fire-Bricks.

WILLIAM STEPHENSON & SONS,
THROCKLEY,
NEWCASTLE-ON-TYNE,

STOURBRIDGE FIRE-CLAY WORKS.

E. BAKER & CO.,
24 WHARF, HARROW ROAD, PADDINGTON, W.

FIRE-BRICKS, LUMPS, SQUARES, and TILES of all dimensions.
GAS-RETORTS always in stock.
GARDEN EDGINGS of various patterns.
ORNAMENTAL BUILDING BRICKS.
GRATE BACKS in various designs.
Contracts entered into to set Retorts, erect Furnaces, &c.
Shipments on the shortest notice.

THOMAS CARR & SON,
MANUFACTURERS OF
FIRE-BRICKS, LUMPS, TILES, RETORTS, &c. &c.
SCOTSWOOD FIRE-BRICK WORKS, NEAR BLAYDON-ON-TYNE.

ADDISON POTTER,
WILLINGTON QUAY,
NEAR NEWCASTLE-UPON-TYNE,
Manufacturer of Clay Retorts, Fire-Bricks, and every description of Fire-Clay Goods.

HARRIS and PEARSON,
PROPRIETORS OF
BEST CLASS-HOUSE POT AND CRUCIBLE CLAY
MANUFACTURERS OF
FIRE BRICKS, GAS RETORTS, &C.
AMBLECOTE FIRE CLAY AND BRICK WORKS,
STOURBRIDGE.
Late in the occupation of I. and W. King. Originally J. Pidcock, Esq.
NB A quantity of best Clay Retorts in stock, viz.—Circulars, 14 inches, 15 inches. 16 inches.
D's, 16×12, 15×14, 20×16, 16×18.

HANCOCK'S INDIA-RUBBER GAS-TUBING.
All sizes, from ⅛ in. to 4 in. diameter and upwards.
Also,
INDIA-RUBBER BAGS for GAS-MAINS.
WASHERS for GAS and STEAM JOINTS.
VALVES (pure solid Rubber) for STEAM-ENGINES.
PACKING (Roll or Sheet) for STEAM-ENGINES.
STRAPS (Rubber and Canvas) for DRIVING MACHINERY.
HOSE-PIPES to convey HOT or COLD WATER.
COKE-HOSE, made specially for rough usage.
GAUGE GLASS RINGS and WASHERS.
SUCTION and DELIVERY HOSE-PIPES for PUMPS, FIRE-ENGINES, BREWERIES, and FACTORY purposes.
BRASS JETS, STOP-COCKS, SPREADERS, and UNION CONNECTING-JOINTS fitted to ditto.
Illustrated Price-Lists on application.

JAMES LYNE HANCOCK,
Vulcanized India-Rubber Works,
GOSWELL MEWS, AND 266, GOSWELL ROAD, LONDON, E.C.

Trade Mark. THE MEDAL FOR 1862.
THE ONLY PRIZE MEDAL AWARDED FOR TUBES AND FITTINGS.
CROWN TUBE-WORKS,
WEDNESBURY, STAFFORDSHIRE.
WAREHOUSE—81, UPPER GROUND ST., LONDON.
JAMES RUSSELL & SONS,
Patentees and First Makers of Wrought-Iron Tubes.

W. J. HOLLANDS,
IRON MERCHANT,
31, BANKSIDE, LONDON, S.E.
SOCKET, FLANGE, HOT-WATER PIPES, AND ALL CONNEXIONS; RETORTS, HYDRAULIC MAIN, LAMP-COLUMNS, &c.; AND EVERY DESCRIPTION OF CASTINGS AND WROUGHT-IRON-WORK FOR GAS AND WATER-WORKS, STEAM, AND GENERAL PURPOSES.
N.B.—All goods kept in stock, and supplied at wholesale prices. Estimates given, and orders by post punctually attended to the same day.

BIRTLEY IRON WORKS,
CHESTER-LE-STREET,
DURHAM.
Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.
Warehouse in London for Cast-iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.
Office in London, Mr. E. M. PERKINS, 78, Lombard Street.

BELGIAN CLAY RETORTS.
J. SUGG and CO., late ALBERT KELLER, Ghent.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.
Communications, addressed to J. SUGG and CO., GHENT, will receive immediate attention.

ESTABLISHED 1827.
JOHN BEVERLEY and SON,
MARK LANE, LEEDS.
Manufacturers of Patent Metallic Wet Gas-Meters, Station-Meters, Experiment-Meters, Governors, Pressure-Gauges, Syphon-Pumps, &c.
Inventors and sole manufacturers of Beverley's double-cased Gas Cooking Apparatus, unequalled in economy, comfort, and cleanliness.
Meters of any maker altered and put into complete repair, to meet the requirements of the Sale of Gas Act

ROBERT MACLAREN and CO.,
EGLINTON FOUNDRY, GLASGOW,
Manufacturers of all sizes of Cast-Iron Main Pipes, by an improved Patent. General Ironfounders, Gas Engineers, and Wrought-Iron Tube Makers.

D. BRUCE PEEBLES,
Gas-Meter Manufacturer,
FOUNTAINBRIDGE,
EDINBURGH.

BEST AND HOBSON,
LATE
ROBERT BEST,
100, CHARLOTTE STREET, BIRMINGHAM,
Manufacturers of
CHANDELIERS, PENDANTS, BRACKETS,
Brass and Iron Gas-Fittings, Steam and Water-Cocks &c., &c.
Also,
PATENT WELDED IRON TUBES,
For Gas, Steam, Water, and other purposes.
GAS APPARATUS OF EVERY DESCRIPTION.
High-pressure Water-Valves and Cocks, &c., &c.
Plumbers Brassfoundry,
BRASS, COPPER, COMPOSITION, AND LEAD TUBES.
Works: Birmingham, and Great Bridge, Staffordshire.

ALFRED PENNY, Gas and CONSULTING ENGINEER,
WENLOCK IRON WORKS,
21 & 22, WHARF ROAD, CITY ROAD, LONDON.
Mr. PENNY having had a large experience in the construction, alteration, and management of Gas-Works, begs to inform the Directors of Gas Companies that he may be consulted on all matters appertaining thereto. He also manufactures Gasholders, Purifiers, and all the various apparatus used in Gas-Works, and keeps in stock Retorts and Mouthpieces, Socket-Pipes, Bends, Branches, T-pieces, &c. &c.
Plans, Specifications, and Estimates prepared.

FREDERICK RICHARDS,
CONSULTING AND GENERAL ENGINEER,
WILMSLOW, CHESHIRE.
Plans, Specifications, and Estimates made for New or the Alteration of existing Gas-Works.
Gas-Works leased, or Estimates given for the Manufacture of Gas per Contract for a term of years.
Manchester Office: 8, Cateaton Street.

GAS COAL.
MESSRS. RICHARD EVANS & CO., Haydock Collieries, near St. Helen's, are prepared to SUPPLY their best GAS COAL to Gas Companies on favourable terms.
This Coal is extensively used by some of the largest Gas Companies in the Kingdom.
It produces 9,400 cubic feet of 17-candle power, and yields 13 cwt. of coke per ton.

JAMES NEWTON & SONS,
(Established 1820,)
FIRE-BRICK AND TILE MERCHANTS,
Wholesale and for Exportation,
FALCON DOCK, 78 AND 79, BANKSIDE,
SOUTHWARK, LONDON, S.E.,
DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and FIRE-CLAY, and every Article suitable for
GAS AND WATER WORKS.

J. T. B. PORTER & CO.,
GAS ENGINEERS,
MANUFACTURERS AND CONTRACTORS FOR GAS-WORK
Of any extent at Home and Abroad,
GOWTS BRIDGE WORKS, LINCOLN,
AND
JOHN STREET, ADELPHI, LONDON, W.C.

JAMES MILNE & SON,
GAS ENGINEERS, GAS-METER, GAS APPARATUS, AND GASFITTINGS MANUFACTURERS,
EDINBURGH,
& 2, KING EDWARD STREET, NEWGATE STREET, LONDON.

Station-Meters, Governors, Consumers Meters, Gas Lustres, Chandeliers, Brackets, &c., and every description of Gasfittings and Gas Apparatus.

W. and H. SIMMONDS,
RETORT-SETTERS,
7B, SOUTH STREET, NEW NORTH ROAD, ISLINGTON, N.
W. and H. Simmonds having had long experience in retort-setting and the erection of tar-furnaces, beg to inform Directors and Managers of gas-works that they undertake to set or repair Retorts, and find labour and materials or labour only, on the most reasonable terms.

JAMES OAKES and CO.,
ALFRETON IRON WORKS, DERBYSHIRE,
AND
WENLOCK IRON WHARF, 20, WHARF ROAD, CITY ROAD, LONDON,
Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water-Works, including Iron Retorts, Socke and Flange Pipes, Bends, Branches, and Syphons of all sizes, Lamp Columns, &c., &c.
N.B.—Orders for Cast-iron Tanks, Girders, Columns, Cylinders, and all irregular castings, will have immediate attention.
CHARLES HORSLEY, Agent.

WALTER MABON & CO.,
Engineers,
ARDWICK IRON-WORKS,
FAIRFIELD STREET, MANCHESTER,
MANUFACTURERS OF
IRON TANKS, GASHOLDERS,
GAS APPARATUS,
PIPES, VALVES, IRON ROOFS,
WROUGHT AND CAST-IRON GIRDE
DESIGNS, SPECIFICATIONS, & ESTIMATES FURNISHED.

J. STRACHAN,
CONSULTING GAS ENGINEER,
68, KING'S ROAD, READING,
Having had many years experience in the adjustment and regulation of the supply of gas to public lamps, begs to offer his services to Gas Companies, Corporations, or Boards of Health, on reasonable terms.
Contracts taken for laying mains, general repairs, and extension of gas-works.

NOTICE OF REMOVAL.

THE BUSINESS OF

WILLIAM SUGG,

GAS ENGINEER,

is removed to his New Factory,

VINCENT WORKS, VINCENT STREET,

REGENT STREET, WESTMINSTER.

WATER AND GAS PIPES,

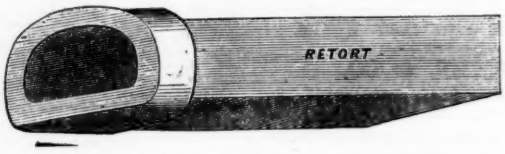
AND EVERY DESCRIPTION OF CASTINGS.

CLARIDGE, NORTH, AND COMPANY,

PHŒNIX FOUNDRY, BILSTON.

KING BROTHERS,

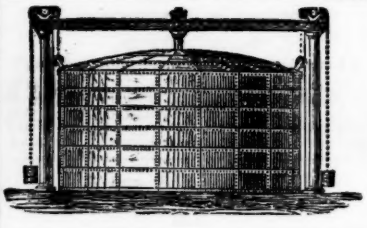
STOURBRIDGE FIRE-BRICK AND RETORT WORKS.



KING BROTHERS beg especially to call the attention of Gas Companies to the superiority of their Retorts, which are made from the celebrated STOURBRIDGE FIRE-CLAY. Mr. King has patented a Kiln for burning Retorts, by which Patent all Cold Air is excluded from the Kiln while burning, thus rendering them FREE FROM CRACKS AND CORRECT IN FORM. By great care in Manufacturing, combined with the advantages in burning, a VERY SMOOTH SURFACE is obtained, rendering them less liable to carbonize.

Retort Ovens, Fire-Bricks, Guards, Saddles, Rabbitted Burs, Flues, and Quarries, are all Manufactured of the same quality of Clay.

Every Retort and Brick is branded "King Brothers, Stourbridge.'



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FOR TOWNS, VILLAGES, &c.

INVENTED AND MANUFACTURED BY

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WHITESTONE IRON-WORKS, HUDDERSFIELD.

WILL BE SENT ON APPLICATION:—

PLANS, SPECIFICATIONS, and PRICES of GAS APPARATUS;

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PLANS of the IMPROVED ANNULAR CONDENSERS;

PLANS of the COMBINED PURIFYING APPARATUS, so eminently adapted for Exportation.

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W. INGHAM and SONS, having for many years been extensively engaged in the Manufacture of

RETORTS AND FIRE-BRICKS FROM THE CELEBRATED WORTLEY FIRE-CLAY

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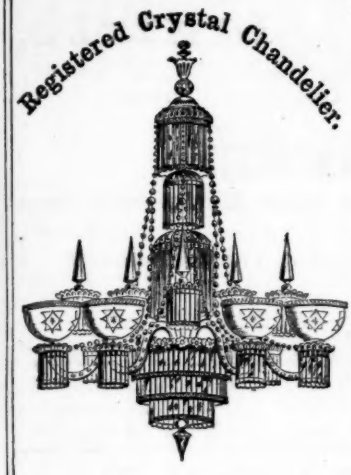
N.B.—*Export orders continue to have prompt attention.*



TO GAS COMPANIES AND THE TRADE.

NOTICE OF REMOVAL IN CONSEQUENCE OF THE LATE FIRE.

J. DEFRIES AND SONS,

Gas Engineers, and Manufacturers of

CRYSTAL, BRONZED, & ORMOLU Chandeliers;

IMPROVED CRYSTAL STAR & SUN LIGHTS;

VESTIBULES, and every description of Gas-Fittings.

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The PATENT GAS-REGULATOR and PURIFIER reduced to **6s. 6d. per dozen.** *Pattern-Books of Gas-Fittings, Crystal and Ormolu Chandeliers for* 1865-66 *are now complete.*

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References to several London and provincial Gas Engineers of the highest eminence can be given on application to W. DAWBER & SON, to whom all orders should be addressed.

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1862.

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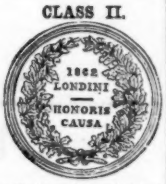

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RETORT SETTINGS, heated by tar without the production of smoke.

STEAM-ENGINES and EXHAUSTERS, separately or combined.

FOUR-WAY VALVES, one of which is equal to three ordinary Valves.

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CROLL'S DRY GAS-METER,

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Of the best material and workmanship, carefully adjusted to meet the requirements of the SALES OF GAS ACT.

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Employed by the best experimenters in this country and on the continent, and by the Gas Testers in the London districts.

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